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IMPROVED STAVE-JOINTER.

The accompanying cuts illustrate a very simple and efficient machine for jointing and dressing staves, for which a patent was issued through the Scientific American Patent Agency to Henry Benter, of Wheeling, Va., Feb. 22, 1859.

For jointing the edges of staves a pile, *a*, of staves is placed in the frame B, as shown, opposite the revolving cutter-head, *b*. The frame, B, slides in ways, C C, which are hinged in the middle, and are attached to the stationary frame of the machine by means of set screws passing through slots, so that the frame, C C, may be bent in the middle at any desired angle or placed straight, at the will of the operator. The object of this arrangement is to give the proper curve to the edges of the staves, by approaching them nearer to the cutter at each end than in the middle, as they are carried past it. Rollers with vertical axes are interposed between the edges of the ways and the sliding-frame, B, both to reduce the friction and to obviate the effect of the angle in the ways on the motion of the staves, rounding them with a constant curve. To give the proper bevel to the edge of the staves, they are caused to rest in the frame with a slight inclination from a horizontal position. As it is necessary to vary this inclination for barrels of different sizes, provision is made for adjusting the angle with precision, by a device which is represented in Fig. 2. The staves rest upon a plate, *c*, which is hinged at the back edge, and which is supported at its front edge by set screws which pass through the firm lip, *d*, of the frame; turning these set screws, the angle of the plate, *c*, and consequently of the staves, is varied at pleasure. The staves are held in the frame by a permanent serrated jaw at one end and a movable jaw at the other, which is moved by a screw and crank, as shown in Fig. 2. The frame, B, is moved back and forth, either by hand or by any usual automatic arrangement. For dressing the sides of a stave, it is clamped in the frame with its side to the cutter-head, which is furnished with cutters with convex edges for dressing the insides of the staves, and with cutters with concave edges for dressing the outsides. By introducing a second cutter-head, this operation of dressing the sides of the staves may be carried on at the same time with the jointing of the edges; the staves to be fed to the cutter by vertical toothed rollers.

For any further information in regard to this invention, inquiries may be addressed to Benter, Burkle & Co., Wheeling, Va., who manufacture the machines for sale: suitable for dressing common sized staves, $125; for heavy hogshead staves, $150; for very light staves, $75.

Fig. 1

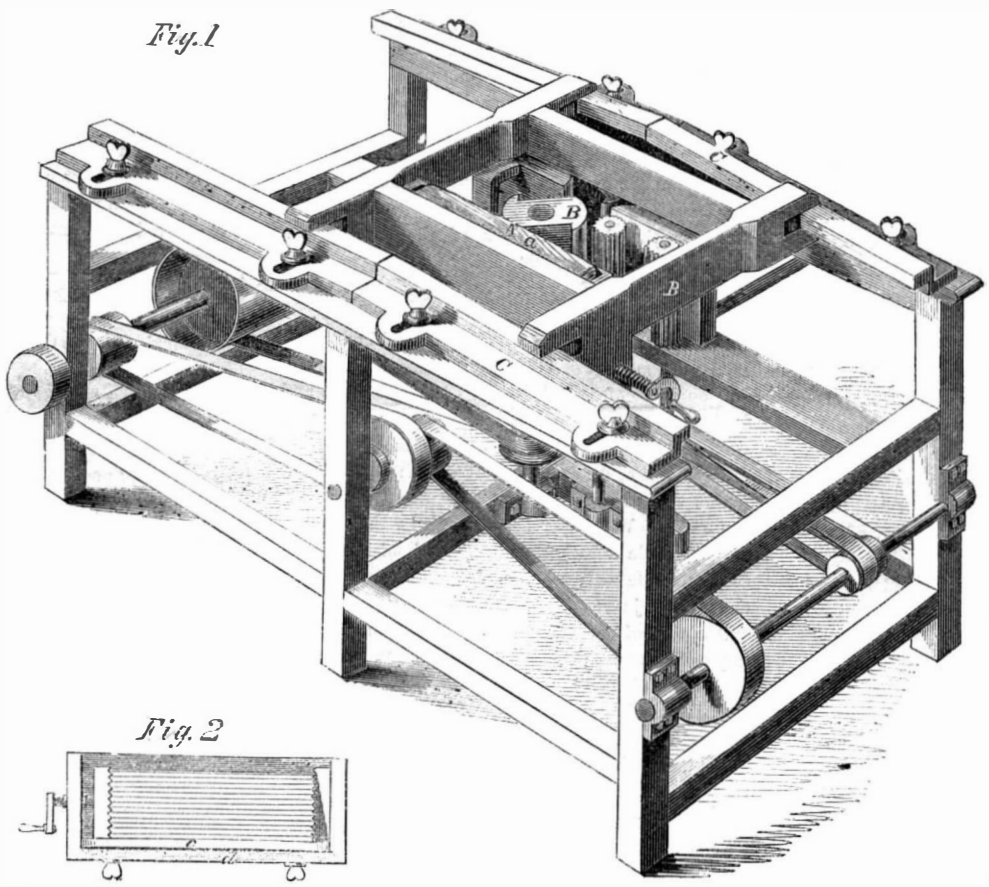

Fig. 2

BENTER'S IMPROVED STAVE-JOINTER.

ANOTHER ARCTIC EXPEDITION IN PROSPECT.

The Boston *Journal* says:—"We are authentically informed that the expedition proposed to our countrymen by Dr. I. I. Hayes, the surgeon of the Kane expedition, is now actually being organized, and will probably start early next spring, under the command of Dr. H. himself. That gentleman has been frequently before the public in our principal cities to present, in lectures, the cogent reasons which exist in favor of another expedition up Kennedy Channel. Such is his confidence in the correctness of the views entertained by Dr. Kane respecting discoveries about the North Pole, that he proposes to undertake, in his own person, the verification, which nothing but a series of extraordinary accidents that could not have been foreseen prevented his commander from completing. All of the leading scientific societies of the United States have already appointed committees to co-operate with Dr. H. in an enterprise so full of promise in many scientific relations. The expressions of interest in the work have not been confined to this country alone. The Vice-President of the French Geographical Society, M. de la Roquette, has been so far convinced of the importance of the expedition to the development of physical geography that he has become a subscriber to the fund to the amount of 500 francs. The President of the Royal Geographical Society of London, Sir Roderick Murchison, at a recent meeting of the eminent body over which he presides, announced the subject as one of leading importance to geographers.

It is proposed, however, to make the expedition strictly an American one; and it is understood that the necessary funds will be raised by private subscription, through the instrumentality of the scientific societies having the matter in charge. The amount required, as announced by Dr. Hayes in a recent lecture, is $30,000, towards which several gentlemen interested in the promotion of science have liberally contributed. Among those whose names have been publicly mentioned, is the distinguished Superintendent of the United States Coast Survey, Professor A. Dallas Bache, who, besides his active services as chairman of the committee appointed by the American Association of Science, to aid this project, has, in a published letter, expressed his readiness to contribute from his private resources the pecuniary means necessary to enable Dr. Hayes to extend the magnetic observations reported by Dr. Kane. It is known that the resolutions of the Geographical Society of New York, adopted some time ago, were supported not only by the Rev. Dr. Hawks, President, but by Mr. Henry Grinnell, one of the Vice-Presidents, whose reputation is world-wide in connection with Arctic explorations—especially those of Lieutenant DeHaven and Dr. Kane. The committee of that society consisted of Messrs. E. L. Viele, Henry Grinnell, August Belmont, H. E. Pierpont, Marshall Lefferts, and its number has since been enlarged with a view to the vigorous prosecution of its appeal to the public; and we cannot doubt the result, as far as New York is to be a participant in the raising of funds."

DEATH OF THE INVENTOR OF THE OMNIBUS RESTAURANT.—The Paris correspondent of the Boston *Traveler* says:—"Among the deaths of the week I may mention the departure of the Viscount Marie de Botherel, the decendant and representative of one of the oldest families of Brittany. His name owed its cotemporary celebrity to another cause. he founded the celebrated enterprise of the Restaurant Omnibuses' which some years ago formed the talk of Paris and furnished the playwrights of the day with a butt for their wit. He had 12 omnibuses laden with hot dishes rolling about Paris every day; 12 omnibuses laden with cold dishes; and 24 omnibuses laden with wines of every description. Three hundred masons built for him, in an incredibly short space of time, a splendid mansion and fifteen kitchens of immense size, where steam-engines of 16-horse power made the pots boil. The project miscarried, and he lost $80,000. Having $62,000 left of his paternal estate, he invested it in the wine trade, and lost all, except a pitiful sum which enabled him to live without asking alms. When death came upon him he was revising the proof-sheets of a book he had written, on Human Infirmities.'"

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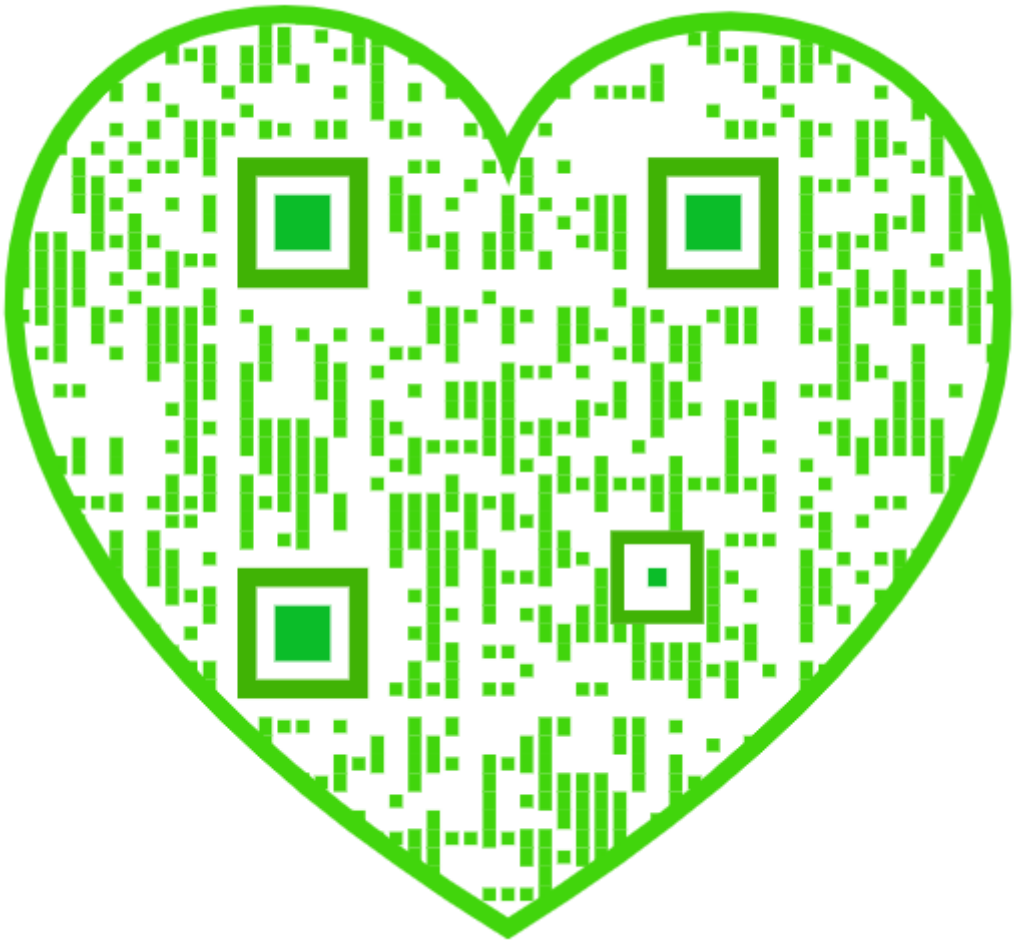

IMPORTANT HINTS ON VENTILATION.

BY E. M. RICHARDS, C.E.

[Written expressly for the Scientific American.]

[Continued from page 363.]

Most of the readers of the SCIENTIFIC AMERICAN have no doubt remarked the languor and sleepiness that are apt to creep over them after sitting for an hour or so in a crowded church. Many persons refer this to other than the real cause—to dullness of the discourse, bodily derangement, &c., while really, in most cases, it is solely to be attributed to a deficiency of vital air. On first commencing the religious services, the supply is generally sufficient; but before the close, it becomes totally inadequate. Many sick stomachs and bilious headaches are thus inflicted on devout but physiologically ignorant worshipers.

Our schools are little better than "mephitic dens," in which the poor children are almost poisoned, and their brains stupified, by the impurities they are obliged to take into their systems through their lungs. Under these circumstances it is equally impossible for the pupils to attend as well to their studies, and for the masters to exhibit as much tact or patience in imparting knowledge, as they would if they were placed under more favorable circumstances. So keen is the writer's remembrance of the miseries he endured from this cause, during his school-boy days, and so deep his conviction of the lasting injury inflicted thereby, that, if compelled to choose between the two evils, he would prefer having his children to remain untaught all their lives than subject them to the same blood-corrupting process which he underwent.

The railroad car, the ship, the steamboat, all give evidence of the presence of the same demon—foul air. A night's ride in some of our trains is enough to develop consumption in those predisposed to that disease. The climax of horrors, however, is reached in the crowded steamship, where, to an abundance of carbonic acid, are added stinking bilge-water, sea-sick passengers, fumes of cookery, oil and rancid tallow from the machinery, and all other abominations only to be found on ship-board. There is no use in multiplying examples; they are to be found on all sides, if we only look for them.

The following is a good test of the salubrity of any apartment:—Let a healthy person, whose sense of smell is unimpaired, take a brisk walk in the open air, then come at once into the room, and if there is any close or other unpleasant smell, the atmosphere of that room is more or less hurtful. How many of our bed-chambers could pass that ordeal in the early morning, after being slept in during the night?

Having glanced at the prevalence of bad air and the evil consequences that always follow its habitual inhalation, the means whereby we may protect ourselves from it are now to be considered. The *theory* of the whole thing is simple enough: the vitiated air must be removed as fast as produced, and pure air introduced (without intermixture) to supply its place. The *practice*, however, requires some little care. It may be here stated that winter is the season in which people suffer most from defective ventilation, as the external cold makes them carefully close all the apertures in their rooms; while, on the contrary, in the summer, the heat obliges them to open them all. But ventilation is more easily effected during cold weather. We must be careful not to confound *pure* air with *cold*, or *warm* air with *foul;* this is a very common mistake, and a very dangerous one, too, for warm air may be quite pure and cold air just the reverse.

To obtain proper reliable ventilation, it will not do to trust to the doors, windows or fire-places (should these latter exist) of our apartments; the first are for ingress and egress, the second to transmit light, and the last to pass the products of combustion from the fire into the open air. No doubt, in the absence of any better means, the rooms may be kept in a tolerably wholesome condition by the free use of doors and windows, but not in such a perfect, pleasant or economical manner as when proper apparatus is used to secure this result. As before stated, the breath exhaled from the lungs, being heated, rises rapidly to the highest portion of the room, where, if means for its exit are provided, it will at once (in most conditions of the atmosphere) pass out into the open air; but if, as is the case in most buildings, public or private, there is no foul air escape near the ceiling, the heated portion of air under consideration remains a short time suspended aloft; then, as it becomes cooler, it descends lower and lower, till at last it mingles with the air near the level of the mouths of the occupants of the apartment. Should there be an open fire-place, the foul air, having descended from the ceiling, generally escapes in great part up the chimney; having *first come below the level of the mouth*, even of a seated person. This fact is especially to be noted, as showing that an open fire-place very indifferently supplies the place of a regular foul air escape. Some of it may also, in certain states of the external atmosphere, pass out at the crevices over the tops of the windows and the top of the door, supposing them to be closed, as they generally are in winter; but if they are open, of course the case is not so bad. Now, to supply the place of this out-passing vitiated air, fresh air usually comes in through any cracks or openings that it can find at or near the level of the floor; and in cold weather, if there is a fire burning in the apartment, the external air will pour in at any opening it can find, high or low. It is evident that, under these circumstances, the in-coming fresh and the outgoing foul air become more or less intermingled, so that it is impossible for the inmates to breathe any but a partially impure element. Opening the windows in winter, though preferable to being poisoned with noxious gases, is objectionable, as it causes sudden drafts of very cold air, and thus may injure invalids, besides being unpleasant to those in robust health; and, morever, it only somewhat remedies the evil. It cases where there are no fire-places, if it were possible to construct rooms perfectly air-tight (and the best mechanics always leave their work the freest from flaws and cracks), there could be no in-coming or out-going draft in a chamber of this kind; in a very little time it would be impossible to exist, so rapidly would the noxious gases accumulate. It thus appears that, for the ability to remain in such a room without absolute and immediate danger to life, we have to thank the bad joints, crevices and holes left about windows and doors by the defective work of the house-carpenter. Certainly, we of the nineteenth century have not much reason to boast of our advances in the art of house-building, when we thus construct our dwellings. It is not many centuries since there were no chimneys to the abodes of the great and wealthy; a huge fire was kindled in the middle of the large room where the baron and his family lived, the smoke and soot from which fire was allowed to make its escape in the best way it could through an aperture contrived in the roof. The discomforts of an apartment thus warmed can hardly be over-rated. We may perhaps laugh at the rude habits and the little knowledge of "household science" that could tolerate such a state of things; quite forgetting that *we* are just as far behind, in not providing for the exit of the poisonous products of respiration. If we have improved on our forefathers in one respect, we have gone back in another; for the aforementioned opening in the roof, though inferior to the modern chimney for passing the smoke, provided a much better outlet for the other exhalations of the spacious hall below.

[To be continued.]

NEW IDEAS ON AIR NAVIGATION.

[Translated for the Scientific American.]

Dr. P. Reis, of Worms, describes his ideas on navigating a vessel in the air and on controlling its course, in the following language:—"On Nov. 24, 1832, I witnessed, at the lectures of Professor Magnus, in Berlin, Prussia, the following experiment: A small disk was placed on the end of a tube provided with a mouth-piece, and so arranged that said disk could easily be moved on the tube in a longitudinal direction. To prevent the disk from tipping over, it was provided with a hub or supported by suitable braces. By blowing into the mouth-piece with some force, the disk, which at first was at a small distance from the end, began to move towards said end. This phenomenon, which was claimed to have been observed first by some Englishmen and Frenchmen at the same time, was explained by Professor Magnus in the following manner: The air, passing with some velocity from the tube, causes the air in front of the disk to move in the same direction in which it passes from the tube, and a partial vacuum is formed. The air behind the disk, in its tendency to fill up the vacuum, causes the disk to move towards the end. From the same cause, the quantity of water flowing from an opening in a vessel is increased, if a conical tube is attached to said opening; and a piece of paper placed on a small opening, instead of being blown off by a stream of air forced through said opening, is pressed on the same and firmly retained. A very interesting treatise on the deviation of projectiles, caused by the influence of the streams of air meeting each other in opposite directions, was published by Professor Magnus in Poggendorff's 'Annals of Natural Philosophy.' From the fact that the condensation of the air on one side of a ball and the rarification of the air on the other is able to turn a heavy body, moving with such immense velocity, from its straight course, I took the idea that a heavy body might be sustained in the air and its course determined on the same principle. I did not want to apply my idea to balloons, which may be used only as devices for saving life in an emergency or for increasing the buoyancy of the whole apparatus.

"My idea of the form of an air-ship was that of a large cube, on the under side of which one or more fan-blowers are rotated by a steam-engine. The air enters through openings on the side, which are made sufficiently large to prevent any perceptible rarification of the air from this source. The discharge tubes are so arranged that the air can be expelled on each side, through a very large number of small holes, provided with conical mouth-pieces. The velocity with which the air passes through these holes ought to be as great as possible. Particular devices are required to enable the operator to direct the air to one or the other of the sides of the cube, in order to steer the vessel through the different currents of the atmosphere. If many thousands of these small streams of air pass out on one side of the cube, the vacuum effected on the other side will be almost perfect, and the pressure of the atmosphere will cause a motion of the vessel in the same direction. And as the velocity with which which the air fills up a vacuum is very great indeed, it is expected that a vessel arranged on this plan will withstand a heavy gale, and in fair weather it can be steered without difficulty."—*Dingler's Polytechnic Journal.*

MINERAL PRODUCTS OF WESTERN PENNSYLVANIA.

Geologically, the three northwestern counties of Pennsylvania lie just below the coal, not always positively lower, but as the stratification dips southward, all the rocks there would be overlaid with coal, if the coal formations had not been removed by great denuding agencies. These underlying rocks are sandstones and shales, containing many layers of carbonaceous matter yet too slaty for use as coal. They contain also the drainage of the whole system of bituminous coal beds, and in certain strata are actually saturated with coal oil. At several points on western tributaries of the Alleghany river, in Crawford, Warren, and Venango counties, this oil has risen to the surface, and has been, for the entire period since the country was known, collected for various uses and carried away in small quantities under the name of Seneca oil. It is now found that the supply is much on the same principle as that of saline waters in the adjoining geological region, and that by boring, these small springs, which now reach the surface, may be made to produce large quantities, possibly inexhaustable quantities, of an oil essentially the same as that distilled so successfully in recent years from the best bituminous and cannel of western Pennsylvania, Ohio, Kentucky and elsewhere. Coal oil fountains, in fact, are opened, and they pour forth the crude product in quite startling quantities, where it is found that this oil in its crudest state is worth about 40 cents a gallon at the springs. This is certainly a benefit derivable from the coal formation hitherto wholly unexpected, and it is one which no mineral experience in Europe has yet had opportunity to test, since the bituminous coals of the British islands, at least, lie too deeply to ascertain whether the adjacent strata would yield a drainage of coal oil or not. On the southern and eastern borders of the great Alleghany coal field it might be said that oil springs should appear, if such could be relied upon anywhere; yet at many points where cannel and bituminous coal beds lie at elevated positions, and disclose underlying rocks in heavy masses, the whole formation is so much broken up as to render it improbable that oil should be found in quantity. On the Kanawha, and Big Sandy rivers, in western Virginia and eastern Kentucky, there are oil springs which might be found productive, however; and in Alabama the recent coal and lignite formations yield oil springs in considerable number

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and oil may be collected at a profit there, as in this State. A sample of rich oil from the line of the Sunbury and Erie Railroad, a few miles beyond Warren, in Warren county, has just been analyzed by one of our chemists, and has been shown to yield, on distillation, 14½ per cent of a pale limpid oil, of superior quality; 44 per cent of yellow or reddish-yellow oil, second in quality; 12 per cent of a thick oil with paraffine, and a small residuum of coke. It is clearly a true coal oil, capable of very easy conversion into the best forms of illuminating and lubricating oils, with a portion of paraffine or candle-making material, and a mere trifle of residuum and loss. In Venango county, still larger springs have recently been opened, and at one spring near the line of the Sunbury and Erie Railroad, in Crawford county, no less than 600 gallons rise daily from a boring of about 70 feet.—*United States Gazette.*

THE GREAT METEOR OF 1807.

The best authenticated and most intelligible account of the fall of aerolites which has ever been given, is that by Professor Silliman and Mr. Kingsley of the fall which took place in Weston, (now Easton) Conn., on Dec. 14, 1807. We have heard Professor Silliman give this interesting account. As soon as the news of the occurrence reached New Haven, Professor Silliman and Mr. Kingsley proceed to Weston to collect the facts. They conversed with a large number of eye-witnesses, among whom was Judge Wheeler, of Weston. He was walking near his house at half-past six in the morning, when a sudden flash in the northern sky caused him to look up, and he saw a globe of fire passing behind a dark cloud. While behind the cloud its appearance was distinct like that of the sun seen through a fog, but only half or two thirds as large. As it emerged from behind the cloud it flashed with a vivid light resembling what is called heat lightning, streamed across the sky with a waving, conical train, and gradually disappeared near the zenith, the whole transit occupying about half a minute. In the clear sky, there was a brisk scintillation about it like a fire-brand carried against the wind. About 30 or 40 seconds after its disappearance three loud and distinct reports, like those of a four-pounder near at hand, were heard; they succeeded each other rapidly and did not occupy above three seconds; then followed a continued rumbling like a cannon-ball rolling over a floor, sometimes louder and sometimes fainter, which continued a few seconds and gradually died away. The passage of the meteor was accompanied by a fall of stones for a distance of nine or ten miles in the line of its course. The largest of these stones fell in a field belonging to Mr. Seely, within 30 rods of his house. A Mr. Staples lived on a hill at the bottom of which the stone fell. After the last explosion of the meteor, a noise like a whirlwind passed to the east of his house and over his orchard; at the same instant a streak of light passed over it in a large curve, and seemed to pierce the ground; a shock was felt, and a report like that of a heavy body striking the earth. Three or four hours afterwards Mr. Seely chanced to pass by the place where the body fell and discovered it. It had struck a ridge of rock which it had partly shivered, and glanced down the hill obliquely into the ground to the depth of three feet, leaving a hole five feet in length, and four-and-a-half in breadth, and throwing masses of turf and earth to the distance of 100 feet. The stone was in fragments, none of which exceeded the size of a man's fist, and Professor Silliman thought all the fragments together must have weighed about 200 pounds. Another stone fell into soft ground and was not broken; it weighed 35 pounds. Another fell in the road and penetrated the ground to the depth of two feet; it weighed 25 pounds. The most northernly fall was in the limits of Huntington on the borders of Weston, in the road; a Mr. Burr heard the stone fall, and on searching for it an hour afterward, he found that it had struck a granite rock and was broken in pieces, the largest piece not being bigger than a goose egg, and this was still warm. Several other masses fell in different places along the track of the meteor; one weighing 25 pounds, another 14, and another 7. In all cases the fall was distinctly heard by persons in the vicinity, and in one case smoke was seen to rise from the place where the mass fell. Professor Silliman collected such of the pieces as he could procure either by gift or purchase, and they are still to be seen in the cabinet of Yale College, New Haven.

NEW IRON FURNACE.

The people of Pittsburgh have recently been rejoicing at the completion of the first furnace erected in that vicinity for the purpose of making pig-iron. We learn by the *Gazette* that Messrs. Graff, Bennett & Co., of the Clinton Mills, in Pittsburgh, have been the pioneers in this enterprise, and it is remarkable that that city, which is so celebrated for its wrought-iron manufactures, should have been so long dependent upon other places for its pig-iron. As the new furnace is said to be the largest in the West, a brief description of it will be of interest to many of our readers.

The stack of it is 12 feet in the bosh and 45 feet in height. The outside is covered with banded boiler-iron; the inside, as usual, is lined with the best fire-brick. It is supplied with its ore, fuel, and lime (as flux) through two apertures near its top, and all the crude materials for smelting are lifted by an elevator. The engine for the blast, &c., is of 160 horse power; it is upright and was built by Messrs. Robinson, Minis & Miller, of South Pittsburgh. Its cylinder is 28 inches in diameter, its stroke 4½ feet. The blowing cylinder is 65 inches in diameter and 4½ feet stroke, and the pressure of the blast is maintained at 8 lbs. on the inch, which is double the amount that was generally carried a few years since. The hot blast is employed, and the air is forced through a stand of 80 tubes where it is heated in its way to the furnace.

The first run of metal from this furnace was effected on the 25th ult., in the presence of a large number of the leading citizens. All things went off admirably, and we understand that the quality of metal produced was excellent. The first run was smelted from the common Virginia and Ohio iron ore, but the company have laid in a large stock of Missouri ore from the Iron Mountain, also some of the best ores from Lake Superior. In regard to the future of this enterprise the *Gazette* says:—"The making of iron from the ore in Pittsburgh is at length an accomplished fact; the thing has been at length begun under the most favorable auspices, and we have not the shadow of doubt that the iron will be made cheaper and of a better quality than what has been used heretofore."

THE SOUTHERN LIGHTS.

By the following account, which we clip from a Californian cotemporary, it will be seen that the great auroral display of the last of August and first of September, which was witnessed nearly throughout the northern hemisphere, was accompanied by a similar exhibition about the south pole. These lights, in high southern latitudes, are not so strange as they are in the neighborhood of the tropics:—

'The ship *Southern Cross* arrived at San Francisco on the 22d of October, from Boston. The *Southern Cross*, under Captain Howe, left Boston, on the 10th of June, making the passage in 134 days. She passed the straits of Le Maire on August 10th, being 60 days to Cape Horn Then she, of course, got the wind in her teeth, and, being reduced to her small canvas, the stout ship battled the elements for 23 days off the Cape the greater part of the time in heavy gales of wind, with frequent rain, hail and snow squalls. On the night of the 2d of September, during a tremendous gale. a wonderful phenomenon presented itself. The rare spectacle of an aurora australis, or southern lights, was witnessed. It commenced about 1½ o'clock in the morning, and increased in splendor until towards daylight, when it gradually faded before the light of day. Our informant states that the whole heavens were of a deep red, which color was reflected in the ocean, upon which a fearful sea was running. These were surmounted by combs, not of the usual white, but almost blood red. Some of the crew were much frightened. Once, during the night, a tremendous hail and snow squall hustled upon the ship. Through the whole of this, the flames assumed the same roseate hue, and when a spray flew over the ship, it fell to leeward in ruddy showers. Between the squalls, in the clear places in the sky, the mysterious lights were seen shooting up in spiral streaks nearly to the zenith—now flashing out in the intense darkness with meteoric brilliancy, and now looming up against the horizon as with the blaze of some terrific conflagration, so that the glare was reflected upon the sails. Captain Howe and his officers say that they have never witnessed anything equaling this display for magnificence. During the gale, several times at night, brilliant *comosants* or balls of electric fire appeared flickering at the mast-heads, yard-arms, and other salient points."

THE large carpet factory of Messrs. Higgins & Co., Forty-third street, this city, was destroyed by fire on the 30th ult. A number of new looms had just been put up for weaving tapestry carpets. All was lost.

HIGH RAILROAD SPEEDS.

During past years, we have on several occasions directed attention to improving the "permanent way" of railroads, as being the most important means of securing higher speeds on them without proportionally increasing the working expenses. In Vol. X. of the SCIENTIFIC AMERICAN we maintained a lengthened controversy with the *New York Tribune* (which paper was then countenanced in its views by the *Railroad Advocate*), in which discussion we assumed the position set forth on page 389 of that volume, that defective permanent way, and not atmospheric resistance, was the great existing obstacle to attaining much higher speed on our railroads. Four years have rolled past since then, and in a recent number of the *London Engineer*, we find a very well written article on this subject, in which opinions corresponding to ours are expressed with the utmost confidence in their correctness. It says:—"For anything that can be seen, a speed of 30 miles per hour upon the water is practically impossible; whilst a speed of 100 miles per hour upon land is not impossible, unless from undeniable imperfection in the structure of our lines. With a proper condition of permanent way, and with sufficient power, there would probably be no difficulty in maintaining a speed of 10,000 feet per minute at the peripheries of the driving-wheels. A different construction of boiler, in which the steam would be generated in small tubes, and to a pressure of from 200 lbs. to 300 lbs. per square inch, would probably be requisite. *The permanent way appears to be the principal matter in which radical improvement is necessary.*"

On the page already referred to, there will be found the following sentence:—"We asserted years ago that trains could be run with ease at the rate of 100 miles per hour." On page 403 of the same volume will also be found the following sentence:—"We have been the constant advocates of improvements in our railroad system, and have frequently pointed to the great source of expense in working them, viz., defective permanent way, embracing numerous curves, inclines, bad tracks, &c." We recall these things because there seems to be a feeling prevailing at present in regard to the increase of speed both in steamers and on railroads, and the *Engineer* says: "We are not to expect that we have attained the limit of railroad speed, nor that future practice is to rest satisfied with the rates which have generally been maintained for the last fifteen years."

OUR PRECIOUS METALS.

In our last issue we gave a brief description of the great improvements which had been made in gold-mining, whereby auriferous deposits, otherwise unworkable, were now yielding vast quantities of gold. Every week brings us some fresh instance of the increasing value of our gold fields. During the past week, the steamer *Baltic* arrived with $1,700,000 of gold, which makes the product $36,000,000 already received this year. By the first of January next, $4,000,000 more will be added to the year's product, thus making a total of $40,000,000. This is an increase of $4,000,000 over the import of 1858, and $6,000,000 over that of 1857. This is a very cheerful feature regarding our annual gold crop.

In connection with our gold products, it appears that we are about entering upon a most fruitful enterprise of mining silver in Arizona. It is true that silver-mining is entirely different from gold-washing, but the silver-bearing rocks of this new territory are said to be so extensive and so rich in this precious metal that, in the course of a few years more, when our companies have their machinery in full operation, they will be yielding more silver than all the other argentiferous mines in the world.

ANTIQUITIES AT MARIETTA, OHIO.—Some workmen, while recently excavating for a cistern in the above place, after passing through six feet of sandy loam, and through three feet of conglomerate rock, so hard as to require blasting, found under the conglomerate a cavity, about a foot in depth, and in the earth below this cavity a human skeleton and the bones of animals. The bones were very old and crumbling. The skull of the skeleton, the most precious part to the ethnologist, was broken to pieces by a blow from a pick. A part of the upper jaw contained teeth, which were very much worn. It is somewhat difficult to account for the location of the bones. The conglomerate and accompanying sand appear to be a part of original strata, which, in the estimation of geologists, are older than the human race.

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THE DENSITY AND TEMPERATURE OF STEAM.

We extract, from the London *Engineer*, the following account (read before the British Association for the Advancement of Science, by William Fairbairn, F.R.S.) of some researches to determine the density of steam at all temperatures:—

I propose to give a short sketch of an apparatus, and the results of the earlier experiments which, in conjunction with my friend, Mr. Thomas Tate, I have been investigating by direct experiments, with the intention of determining the law of the density of steam and other condensable vapors; and thus to solve a hitherto almost untouched problem by an experimental method, which will verify or correct the theoretical speculations in regard to the relation between the specific volume and temperature of steam and other vapors. The experiments are being conducted, it is believed, upon an entirely novel and original principle, and one which is applicable at any temperature and pressure capable of being sustained by glass vessels.

For a perfect gas, the law which regulates the relation between temperature and volume is known as Gay-Lussac's or Dalton's law, and is expressed by the equation:—

$$\frac{V \times P}{V_1 \times P^1} = \frac{458 + t^1}{458 + t} \quad \text{.....(1)}$$

Now, density of steam has been determined with accuracy by direct experiment at the temperature of 212° —and at that temperature only—by the method of Dumas. At 212° Fah., its density is such that its volume is 1,670 times that of the water that produced it. Substituting these values of volume, temperature, and pressure, we get for the volume of steam from a unit of water at any other temperature:—

$$V = \frac{1670 \times 15}{670} \times \frac{458 + t}{P},$$

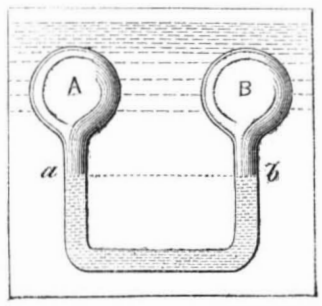
$$\text{Or, } V = 37\tfrac{1}{3}\,\frac{458 + t}{P}, \quad \text{.....(2)}$$

This is the well-known and received formula from which all the tables of the density of steam have hitherto been deduced, and on which calculations on the duty of steam-engines have been founded. Up to the present time, however, this formula has never been verified by direct experiment, nor are the methods hitherto employed in determining the density of gases and vapors applicable in this case, except at the boiling temperature of the liquid at the ordinary atmospheric pressure. But, on the other hand, theoretical speculations throw considerable doubt on the accuracy of the above formula when applied to steam and other condensible vapors. Several years ago, Dr. Joule and Professor William Thomson announced, as the result of applying the new dynamical theory of heat to the law of Carnot, that, for temperatures above 212° Fah., there is a very considerable deviation from the gaseous laws in the case of steam. Later, in 1855, Professor Maquorn Rankine has given a new theoretical formula for the density or steam, independent of Gay-Lussac's law, and confirmatory of Professor Thomson's surmise. But as yet these speculations need the evidence and verification of direct experiment.

The density of steam is ascertained by vaporizing a known weight of water in a glass globe of known capacity, and noting the exact temperature at which the whole of the water becomes converted into steam. From these three elements—volume, weight and temperature—the specific gravity is known. But in pursuing this method, these two difficulties must be overcome: first, the pressure of the steam renders it necessary that the glass globe should be heated in a strong, and consequently, opaque vessel; second, as steam rapidly expands in volume for any increase of temperature, beyond the temperature of saturation, it would, in any case, be impossible to decide by the eye the temperature at which the whole of the water became vaporized. The temperature of saturation, or temperature at which the whole of the moisture is converted into steam, while no part of the steam is superheated, must be determined with the utmost accuracy, or the results are of no value.

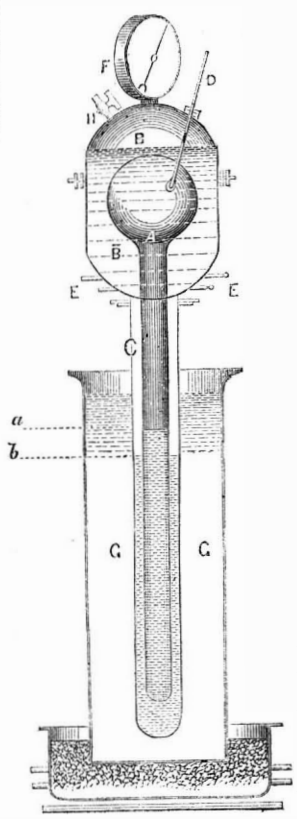
The difficulties thus revolve themselves into finding some other test of sufficient accuracy and delicacy to determine the point of saturation. This has been overcome by what may be termed the saturation gage; and it is in this that the novelty of the present experiments consists.

To illustrate the principles of the saturation gage, suppose two globes, A and B (Fig. 1), connected by a bent tube containing mercury at *a b*, and placed in a bath in which they can be raised to any desired temperature. Suppose a Torricellian vacuum to have been created in each globe, and 20 grains of water to have been added to A, and 30 or 40 grains to B. Now, suppose the temperature to be slowly and uniformly raised around these globes; the water in each will go on evaporating at each temperature, being filled with steam of a density corresponding to that temperature, and the density being greater as the temperature increases. At last a point will be reached at which the whole of the water in globe, A, will be converted into steam, and at this point the mercury column will rise at *a* and sink at *b*; this is the saturation test, and the cause of its action will be easily seen. So long as vaporization went on in both A and B, and the temperature was maintained uniform, each globe would contain steam of the same pressure, and the columns of mercury, *a* and *b*, would remain at the same level. But so soon as the water in A had vaporized, and the steam began to superheat, the pressure in A would cease to remain uniform with the pressure in B, and the mercury columns would at once fall, and thus indicate the difference. The instantaneous change of the position of the mercury is the indication of the point at which the temperature in the bath corresponds with the saturation point of the steam in A.



To show the delicacy of this test, I may instance that, at 290° Fah., the mercury column would rise nearly two inches for every degree of temperature above the saturation point, as the increase of pressure arising from vaporization is 12 times that arising from expansion in superheating at that point, and a similar difference exists at other temperatures.

The apparatus, as employed for experiment, varies according to the pressure and other circumstances of its use. Fig. 2 represents one of the arrangements which has been employed with success. It consists of a glass globe of about 70 cubic inches capacity, in which is placed, after a Torricellian vacuum has been formed, the weighed globule of water. The globe, with the stem, is shown at A; this is surrounded by a copper boiler, B B, prolonged by a stout glass tube, C, enclosing the globe stem. This copper boiler forms the water and steam bath through which the globe is heated, and, in fact, corresponds to the second globe, B, in the former figure. The fluctuating mercury column, or saturation gage, is placed at the bottom of the tube, C, and the saturation point is indicated by the rise of the inner mercury column, *a*, and the fall, at the same time, of the outer mercury column, *b*. As soon as the whole of the water in the globe A is evaporated, there is an instantaneous rise of the inner mercury column to restore the balance of pressure, and that progressively with the rise of temperature.



As an auxiliary apparatus, the boiler is provided with gas-jets, E, to heat it, and with an open oil bath, G, to retain the glass tubes at the same temperature as the boiler; and this oil bath is placed on a sand bath, and also heated with gas. A thermometer, D, registers the temperature, and a pressure-gage, F, the pressure of the steam; and a blow-off cock, H, serves to reduce the temperature when necessary. A number of results have already been obtained, but they are not yet sufficiently advanced to be made public. The following numbers have been, however, approximately reduced from the theoretical formula above, and the experimental results may illustrate the use of this method of research. The most convenient way of expressing the density of steam is by stating the number of volumes into which the water of which it is composed has expanded. Thus, one cubic inch of water expands into 1,670 cubic inches of steam at 212° Fah., into 882 cubic inches at 251°, and into 400 cubic inches at 304°, and so on. In this way, the following numbers have been computed:—

Temperature.	Volume of steam. By formula.	By experiment.
244°	1,005	896
245°	969	890
257°	790	651
262°	740	680
268°	680	633
270°	660	604
283°	240	490

These determinations, at pressures varying from 10 lbs. to 50 lbs. above the atmosphere, are not accurate reductions from the experimental results, but only approximations. But they uniformly show a decided deviation from the law for perfect gases, and in the direction anticipated by Professor Thomson, the density being uniformly greater than that indicated by the formula. I hope, by the time of the next meeting of the association, with the assistance of my friend, Mr. Tate, to be enabled to lay before the section a series of results which will fully determine the value of superheated steam, and its density and volume compared with pressure at all pressures, varying from that of the atmosphere to 500 lbs. on the square inch.

COMPASSES ON IRON SHIPS.—The great liability of compasses becoming affected by local attraction in this class of vessels has been the cause of many disastrous wrecks, and we have now another to add to the list. From the testimony of the third mate of the *Indian*, which was recently wrecked on the coast of Nova Scotia, it would appear that they supposed themselves to be forty miles distant from the place where she went on the reef. They were running along at the speed of ten knots per hour, thinking they were perfectly safe, according to the points of the compasses, when they were running into the jaws of death. Such are the statements which have been made public regarding this unhappy event. No ship should go to sea unless furnished with the most perfect compasses to be found for obviating local attraction; and yet we have been informed that there is not a single compass of the common construction that is reliable on an iron steamer.

IRON DISCOVERIES IN TEXAS.—The State geologist of Texas, it is said, has recently made discoveries of immense importance to the State, which are no less than the existence of vast bodies of iron ore, as well as tertiary coal or lignite, beds of limestone, pipe-clay, fire-rock and hydraulic limestone, in the region of country immediately south of Harrison county, in which Marshall is situated, and between that and the point on the Sabine river at which the Houston and New Orleans Railroad and the Opelousas Railroad will reach that river.

NEW SPECIES OF COTTON.—A specimen of cotton from the farm of James Boyd, Senr., has been shown to the Chester (S. C.) *Standard*, which says: "The bolls are very numerous, and are of extraordinary size, thirty of which, when picked, weigh a pound." This cotton is thought to be of a new or peculiar species. Mr. Boyd, having obtained a few seeds, has managed, by keeping this product separate from other cotton, so as to now have a considerable quantity for planting. He thinks that from one acre he will raise 1,600 lbs.

MEANS OF FASTENING LEATHER UPON METAL.—The metal is washed with a hot solution of gelatine, and the leather previously steeped in a hot infusion of gall nuts, pressed upon the surface and allowed to cool. It then adheres so firmly that it cannot be separated without tearing.—*Algemeine Polytechnic Zeitung.*

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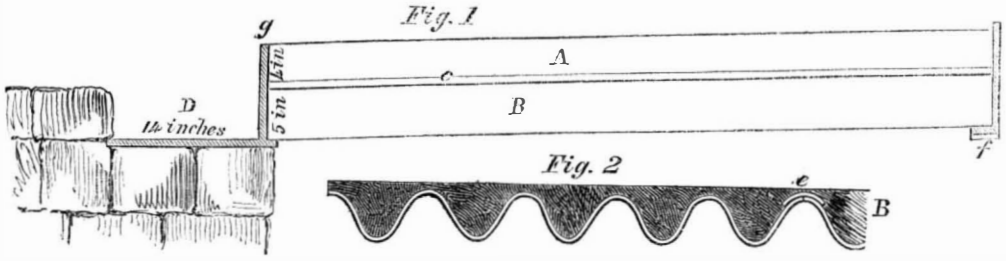
IMPROVED CEILING PLATES FOR VAULTS.

The people who spend their days under the sidewalks of this city would form a population for a considerable town. Among the ceaseless tide of human beings which pour along above the flag-stones on each side of Broadway, how few ever think of their fellow-men who are busy beneath these stones, producing the wealth that is displayed above. So valuable has room become in portions of this city, that it has become profitable to excavate vaults under the sidewalks, and some even extend them to the middle of the street. In these places steam-engines are placed, shops for repairs and manufacturing are established, and a vast variety of industrial operations are prosecuted. Of course, it is absolutely essential that the coverings of these vaults should be perfectly waterproof. The mode of covering generally adopted has been to turn brick arches and fill in over the top



IMPROVED CEILING PLATES FOR VAULTS.

with masonry, giving a slight descent towards the street; the top was then made smooth with mortar and covered with a layer of melted asphaltum. A covering of masonry of the character described is about two feet thick, and this thickness is objectionable, occupying so much room in the vault, or necessitating the sinking of the vault so much deeper. The annexed cut represents a vault ceiling, only ten inches in thickness, which has just been used at the fine building erected on the corner of Broadway and White-street.

Fig. 1 is a cross section of the sidewalk, and Fig. 2 represents one of the sections in which the corrugated ceiling is cast. B is a corrugated plate of cast-iron, about one inch thick, reaching across the sidewalk from the area to the curb, cast in sections of five corrugations each; the corrugations being five inches in depth and nine and one-fourth inches in width, and closed at the ends by inch plates of iron cast upon them, thus forming water-tight troughs. Where these sections meet, the joint is covered by a curved plate, *e*, the whole construction rendering the ceiling absolutely waterproof. The ceiling plates, B, rest at the edge of the area upon a flange of the iron supporting beam, *f*, and at the street end upon a flange of the iron beam, *g*, which forms one side of the gutter. The corrugations are filled with concrete which is laid to a depth of one inch above them, and over this the flag-stones are laid, the concrete and the flag-stones operating to prevent the noise from the street penetrating to the vault.

The vault, of which this is an illustration, was constructed by J. B. & W. W. Cornell & Co., whose establishment is at No. 143 Center-street, New York.

IS THE MANUFACTURE OF OIL FROM COAL PROFITABLE?

MESSRS. EDITORS:—This appears to be rather a queer question, and a few months ago, or perhaps even at the present time, everybody who knows nothing and everybody who believes to know something about the above branch of industry would say: "Certainly! Coal-oil manufacture is the most lucrative business in the world, because—everybody says so!" Let us look a little closer, however, and see whether the answer is correct; how much money has been made in making coal-oil, and what may be the prospects for the manufacturers.

A former writer in the SCIENTIFIC AMERICAN asserted that none of all the numerous coal-oil companies had yet paid a dividend; and close examination proves this to be the case, with perhaps one or two exceptions. The reasons are obvious, although unknown to the public at large, and even to many stockholders; a few of those reasons may be found in the succeeding paragraphs.

Most of those that engaged in the coal-oil business had no practical acquaintance whatever with the *modus operandi*. Reading that mischievous article which went through the papers of this country, that Mr. Young had declared, under oath, that he was making more than $200,000 a year in the manufacture of paraffine oil from coal, everybody was anxious to make as much, if not more. It was thought that all that would be necessary consisted in obtaining cannel coal and establishing coal-oil works. Companies were started accordingly, with capitals ranging from $50,000 to $4,000,000; prospectuses were got up, showing clearly to everybody who would believe them, that a mine of cannel coal was at least as valuable as a rich vein of gold; all that was necessary to get the gold was to build oil factories and make oil. Proofs of the truth of all this were Mr. Young's declaration under oath, the quantity of oil that would be produced from a tun of coal and the price it would bring. Bankers and lawyers, ministers and officers of state, merchants and mechanics, "went in"; everybody feeling sure to make a fortune, if not in a week or a month, at least in a year, The land with coal being purchased, and a charter obtained, all the company had to do now was to build the works.

At last, a factory is built, although it has cost three times the amount calculated upon, and taken three times the time to complete; yet it is finished, ready to make oil and, consequently, money. The retorts were charged and fired; but here came the first disappointment. In place of the expected number of gallons of crude oil per tun, seldom more than half was obtained; some who believed to have a tank holding many hundreds of gallons full of oil, found that more than half of it was water! This latter circumstance is an instance of the complete ignorance of the manufacturers in regard to their chosen branch of business. The crude oil retorts broke and cracked without giving any particular notice of their intentions, and causing a very serious damage. Now, all sorts of experiments were made to obviate the breaking of retorts and to obtain more oil from the coal. Revolvers and self-fillers, clay and brick retorts, meerschaum and kiln, round and oval, square and D-shaped, upright and horizontal retorts were tried with ordinary and superheated, low pressure and high pressure steam, exhaustors and air-pumps, to assist. The stockholders grumbled—perhaps swore; but they had to pay for all these costly experiments. These only were the trials incident to the manufacture of crude oil; now came the purification of the oil. If the first manner of proceeding had been changed and re-changed, this was doubly and trebly so. Here were used concave and convex bottomed, high and low domed, cast and wrought-iron stills, with steam in every possible way of application and condensers of every imaginable shape. Chemicals of most heterogenous properties were tried, and large prices paid for information promising to make oil odorless and colorless. The product was this time too dark, next time too heavy, now the oil would smoke, then it had a perfectly unbearable odor, &c. Again, the article presumed to be the most valuable product of the coal, namely, heavy oil, usually called lubricating oil, turned out to be not exactly the thing for greasing machinery.

In the above way, from one experiment to another, from one failure to another, the companies stumbled along. All this time, people believed that the manufacture of coal-oil was one of the most lucrative of all the branches of industry; and one factory after another was erected. Why this belief prevailed, or why the real truth never leaked out, or was only known to a few, is not very difficult to imagine; if a company is prosperous, or is thought to be so, its stock is sought for and may be sold; the stock of a losing concern nobody will purchase. How little some coal-oil refiners knew about the value of crude oil, and perhaps their business in general, may be seen from the fact that eastern refiners paid from 25c. to 40c. for a gallon of crude oil, whereof it took from three to four gallons to make one of purified burning oil; thus paying more for the crude article than the market value of the saleable purified product.

As to the prospects of the coal-oil trade for this year, they are quite the reverse of flattering. Some manufacturers have at last succeeded in making a good article; but they find that, in order to make a good oil, it requires a great deal of attention and skilled experience; and that a gallon of it will cost far more than people generally suppose. The production of oil has far outstripped the demand, although the consumption is on the increase. The price of oil has dropped down considerably in consequence, and already a good deal of oil of eastern manufacture has been sold at a price ruinous to the manufacturer; and if the price of it goes below the present figures, prudent manufacturers will stop. The best advice to coal-oil manufacturers is, not to make other than a good article, and not to sell but at a paying price.

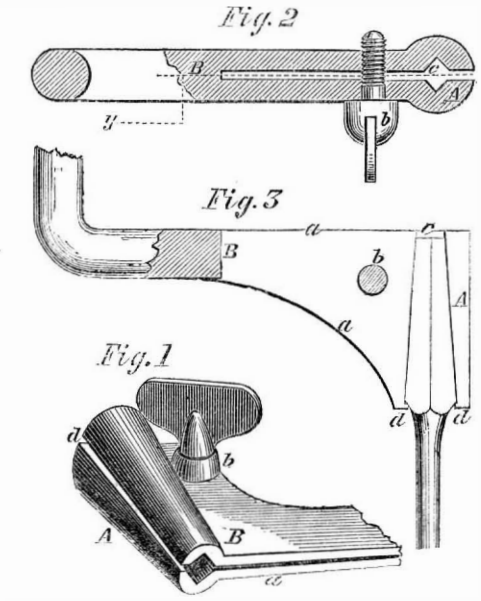
* * *

Cincinnati, Ohio, Dec. 5, 1859.

IMPROVED BIT STOCK.

This is a very simple device for holding boring-bits in braces, by which the necessity of fitting the shank of the bit nicely to the socket in the brace, and of filing a notch in the shank is avoided, thus rendering it a cheap article of manufacture.

The plan is to construct the socket and end of the brace in two parts, as if they were split vertically, the parts to be held together by a thumbscrew, and the socket to be furnished at its mouth or larger end with a lip about 1-16th of an inch square, projecting inward. The shank, being inserted past this projection and the divided parts brought together by turning the clamping screw is securely held in its place. A glance at the



engravings will render this plain. Fig. is a perspective view of the brace, Fig. 2 a horizontal section of the socket and divided end, and Fig. 3 a vertical section of the same. A and B are the two halves of the split end, *c* the socket, *b* the clamping screw, and *d d* the projecting lip. The object of this invention is to obviate the necessity of filing a notch in the shank of the bit, and fitting the shank so nicely, as was formerly required, to the socket in the brace. The lower arm and thumbscrew are made of steel. A further improvement in this brace is in the manner of hanging the head. A cup-shaped piece of steel is inserted in the head, and the spindle of the stock, which is also made of steel and nicely polished, fits into this cup; thus reducing the friction to the lowest possible point.

The patent for this invention was secured, through the Scientific American Patent Agency, Nov. 1, 1859, to N. Spofford, of Haverhill, Mass., who may be addressed at that place for further information in relation to the matter.

LAUNCH OF AN IRON STEAMER.—The iron steamer *Matanzas*, minutely described by us on page 255 of the present volume, was launched from the ship-yard of the builder, C. H. Delameter, foot of Thirteenth-street, North river, on Monday, Nov. 28th. It is said that another vessel similar to this, but of larger dimensions, is to be built at the same yard for the same parties.

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NOTES ON FOREIGN INVENTIONS.

Railroad Mirror Signals.—A locomotive has been placed on a railroad between the Bickershaw Collieries and Leigh, England, which has its weatherboard made of plate glass, forming a screen, while projecting over the frame of the engine are arranged large adjustable mirrors set at a proper angle. By means of these reflectors, the engineer has a view of the whole train behind him, so that in case of a casualty to any one of the cars, he can see it reflected in the mirror on his engine. Some trial trips have been made with this apparatus, and they are stated to have been very satisfactory. As such mirrors may be applied at no great expense to every locomotive, (if found to increase the safety of traveling in the least,) they should certainly be adopted on all railroads.

Feeding Boilers.—A patent has been issued to T. Burnett, H. T. Sorbuts and W. Lloyd, in England, for the following method of supplying feed water at a high temperature to steam boilers. The exhaust pipe connected with the cylinder of a steam-engine is conducted so as to extend below the aperture leading to the ordinary condenser, and terminates in a small vessel which is employed as a separate condenser. A portion of the ordinary injection water is thrown through a number of small jets into the exhaust-pipe, in order that it may come in contact with the exhaust steam immediately as it leaves the cylinder, and thus absorb a large portion of the heat before it enters the ordinary condenser. The water so injected, together with the water which has been condensed from the steam, passes at a high temperature into a separate small condenser, from which the boiler is supplied with the requisite quantity of feed water at this increased temperature; a small air-pump being employed to lift the heated water to the ordinary force pump by which it is forced into the boiler.

Clogs or Shoes with Wooden Soles.—In England such shoes have been worn from time immemorial by the peasantry of Lancashire, but hitherto the soles have all been made by hand, a method which is about to be superseded by machinery, invented by W. Brown, of Bolton-le-Moors, England. He cuts the clogs into the requisite form by cutters shaped for the purpose, and to which a rotary motion is given. The soles are formed out of blocks of willow wood, and not only the shape of the wooden soles, but the groove round the edge, to receive the upper is executed by the cutters at one continous operation. The cutters are stated to be supported on a swing-frame to give the proper curve to the sole, and from this we infer the principle of operation must be similar to that of Blanchard's gun-stock machine. Great numbers of such clogs are now manufactured for the negroes on the southern plantations.

Coating Metals.—A patent has been secured by E. Morewood, of Enfield, England, for an improved method of coating iron with zinc. The iron, after being first scoured bright to clear it of oxyd and grease, is admitted to a bath of molten zinc, by first passing it through a bath of sal-ammoniac, all at one continuous operation. The sheets or plates of iron (or wire to be coated) are run through the baths by rollers. They are passed through the molten zinc at about five inches below the surface, and an alloy composed of 75 per pent of lead and 25 of zinc may be made to adhere to the iron by this process. As the zinced iron leaves the bath of zinc, it is first passed through hot water maintained at the boiling point, then it is dipped into cooler water, after which it is dried and rubbed on the surface either with bran or sawdust.

Phosphates of Lime.—M. A. F. Mennons, chemist, of Paris, has taken out a patent for obtaining chemically pure and thoroughly soluble phosphates of lime, eminently adapted for agricultural purposes, by using ammonia to precipitate the phosphate from its solutions of hydrochloric acid, which form what are called "superphosphates." If the ammonia is not too expensive for this purpose, such a product must be far superior to the common phosphates of lime.

Burnishing Paper.—The usual method of glazing paper is by rolling pressure, the webs of paper being calendered between metal and paper rollers. A new method of polishing paper has been introduced by J. Evans, of Hertford, which consists in bringing the paper into contact with sets of polished rolls driven far more rapidly than the surface of the paper. The web of paper is supported during the time it is passing through the calendering rolls by hard polished rolls instead of resting, as heretofore upon rolls of wood and paper. This appears to be an extension of the calico-printers and bleachers' method of calendering cloth for the purpose of glazing it.

Submarine Cables.—Our countryman, D. E. Hughes, of this city, whose name has lately been so prominent before the public in connection with the telegraph, has secured a patent in England for constructing telegraph cables, the object of the improvement being to prevent the electric current escaping even when the usual non-conducting covering of gutta-percha is injured. The conducting wires are enclosed in a tube of gutta-percha, and this is filled with a semi-fluid non-conducting substance, so that if the gutta-percha tube is cut or broken, the semi-fluid will ooze out and fill up the fissure. The semi-fluid used is rosin dissolved in oil or india-rubber dissolved in naptha, or rosin soap, which hardens under sea water when exposed to its action.

Treating Straw for Paper.—In our last issue, we stated that a great quantity of paper, mostly composed of straw pulp, was now manufactured in our country for printing, but that it was not of a quality equal to rag paper. An improvement in treating straw for making a superior quality of paper has just been secured by Letters Patent to R. H. Collyer, London, England, and his process may be of some import. The straw is first soaked or boiled in water to render it soft, then it is subjected to a cutting action and also to a grinding machine. This latter operation seems to be the improved feature. The straw is rubbed between grinding surfaces until every knot is crushed and made into impalpable pulp. In this finely subdivided state, the pulp is boiled in a strong caustic alkali, which dissolves all the silex (hard specks). and it is then reduced to a fine condition. The next process is that of bleaching, which is done by steeping in solutions of chloride of lime in the usual way, the finishing steep being a weak *sour* of sulphuric acid, after which it is washed and beat up into the proper consistency to be laid into webs in the machine.

Feed Water for Boilers.—A patent has been obtained by D. K. Clark, the author of the famous work on railway engineering, for a very peculiar apparatus and arrangement for heating the feed-water of locomotives. It consists in heating the water by the introduction of it in one or more jets into confined channels, and the injection of one or more jets of steam from the exhaust into these passages, in immediate contact with the water, so so as to impinge upon the water, and project it through the passages. By so doing the steam mixes with the water, and is condensed, forming a partial vacuum to draw in the feed and also to heat it.

AMERICAN INVENTIONS IN ENGLAND.—The Bissell truck, an American improvement on the locomotive, is already adopted on the Eastern Counties Railway in England, as well as on many of our own lines. The common locomotive truck consists of a truck holding the four front wheels and turning on a pivot or king-bolt, like the fore-axletree of a wagon. Although such a truck turns round a curve more easily than if it were rigidly parallel to other shafts, and did not turn on its king-bolt, yet its action is hard, like that of a car whose wheels are nearer together on one side than on the other when moving on a straight track. With the Bissell improvement, the truck does not turn on its own center or pivot, but slides sidewise under the engines, being held by a radius-arm extending back under the engine, and fastened to a pin half way between the center of the truck and the forward driving-shaft. Thus all the axles of the engine are more nearly radial to whatever curve the train strikes, the wheels are less likely to run off, and move with less friction, shorter curves may be passed, and the flanges wear less. The chief improvement, however, is that one pair of wheels may be used instead of two pairs, which are necessary in the old truck. Another incidental and considerable advantage is, that with a single shaft, the bearing of the engine is thrown further forward, and the weight necessary to adhesion is thrown further back upon the driving-wheels.— *New York Times.*

A SUCCESSFUL WHALER.—The *Daniel Webster*, a New Bedford (Mass.) whaler has lately returned after a short voyage of one year and five months, from the North Pacific seas, with a cargo of 1,400 bls. of common whale oil, 50 bls. of sperm, and 17,000 lbs. of whalebone.

BURNING OILS.

MESSRS. EDITORS:—On page 270, present volume of the SCIENTIFIC AMERICAN, there is an article headed "More about Coal-oils and Coal," in which a table is given as the result of a photometrical examination of the light-giving qualities and cost of various burning-fluids, by Edward N. Kent, Esq., chemist of your city. I have read your paper for many years, and I know it is not your intention to mislead your subscribers by false statements, yet the statement quoted is calculated to mislead those who are not acquainted with the burning properties and cost of the different oils named in the table. If the cost of oils as given in the table are correct, then your market list of prices, showing that oils can be bought in New York at about half the cost will mislead people as regards the price of oils in your city. Messrs. Austens announce the price of their oils at $1, per gallon, *wholesale*, and then give a table to show how much cheaper it is to burn kerosene than it is to burn any other oil. The list of oils in the table is headed with kerosene, at $1 per gallon (the wholesale price), and then all the other oils are put at about double their value, and by this means kerosene is figured to be the cheapest, and affording a light that will cost about three-fourths less than any other burning oil. We send oil of our own manufacture (lard oil) to your city, and we purchase from your manufacturers, camphene, sperm and whale oil; and we know that these articles could be bought a little lower than your quoted rates. But let us see the difference in prices, as stated in the table on page 270, and the price given as the market value of the oils on page 275:—

Table, page 270.			New York Markets, page 275.		
Camphene ...	$0.63	per gal.	Camphene ...	$0.47 *a*	$0.49
Whale oil ...	1.00	"	Whale oil	58 *a*	60
Lard oil	1.25	"	Lard oil	90 *a*	95
Sperm oil	2.25	"	Sperm oil	1.35 *a*	1.40
Burning-fluid	0.87	"	Burning-fluid	54 *a*	56

The above shows for itself and needs no comment. From what we know of coal-oils we believe that with a good camphene lamp and good solar lamp (the kind named in the table), properly trimmed, we can produce as good a light with camphene, sperm, whale and lard oil as with kerosene. R. S.

Louisville, Ky., Dec. 3, 1859.

A LIGHTHOUSE WANTED AT THE FRENCH KEYS.—The Planas, or French Keys, where the *North Star* got on shore, are two keys of the Mariguana passage, on the route to Aspinwall, and 19 miles from the west end of Mariguana, one of the most northern of the Bahama Islands. This is the passage used by sailing vessels outward bound, and by steamers on their passage to and from Aspinwall. The roll of the Atlantic upon those Keys is so fearfully heavy that the strongest ship would be knocked to pieces in a few hours. The New York Chamber of Commerce, at its last meeting, agreed to memorialize the President of the United States to apply to the British government (to which the island and adjacent keys belong) to erect a lighthouse there. The amount of property yearly passing these Keys is estimated at $150,000,000.

THE GREAT BALLOON VOYAGE.—The country may now safely draw breath! The great suspense is now over in regard to Professor Lowe making the daring attempt to cross the Atlantic to Europe, this season, in his monster balloon. The soaring aeronaut has removed his huge gas-bag, caloric-engine, lime-stove, and all the paraphernalia for his intended aerial trip from the old Crystal Palace Park. According to common parlance, "his card is played out." "The weather was unpropitious," it is said, and of course the Atlantic balloon voyage has been postponed till a more convenient opportunity is presented. Another gas-bubble burst!

WIRE AND HOOPS.—At the wire works of H. S. Washburn, in Worcester, Mass., some iron wire is made which is as fine as hair. Of No. 62 wire, which is the finest, 13 miles will only weigh about seven ounces, About 20,000 yards of steel crinoline is now manufactured daily. It is sold, when covered, at wholesale, at about 50 cents a pound, and about three-quarters of a pound is required for each hooped skirt. It is calculated that about 5,000,000 lbs of crinoline have been used up in hoops, this present year, by various makers.

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PUDDLED STEEL.

On page 317, Vol. XIV, SCIENTIFIC AMERICAN, we described the method of making puddled steel, as pursued in England, and stated that we had been informed of its manufacture having been commenced at the iron works of Corning & Winslow, of Troy, N. Y. Since that period we have not been able to learn whether its manufacture has been successful there or not; but we conclude that it has not, from the fact that it has not found its way into common use. In the New York *Times* of Tuesday, Nov. 29, there is a short article on this subject, apparently by "Tubal Cain," who formerly corresponded with that paper from abroad. He states that puddled steel is now being extensively tried in England for steam boilers, and that its best qualities are as easily worked as copper, and that boilers made of it may be one-third thinner and lighter than those of iron. Thus far the experiment with puddled steel plates in boilers has been very successful, excepting in one important particular, namely, some of the plates split and peel under the intense action of the fire. This is certainly an insuperable objection to its use for boilers, but we are informed that this defect is being gradually overcome. It is stated to be one-fourth stronger than iron, and that it can be made about as easily and cheaply as cast-iron. Its successful manufacture requires an intimate knowledge of steel-working because it is made by partially decarbonizing pig-iron in a puddling furnace, and the work of reduction must be arrested at the exact point or the desired result will not be produced. It takes a practiced puddler of steel to know when this is effected by the appearance of the metal in the furnace, but if this is done in England, it surely can be performed in America, and we should not be lagging behind in such an important matter.

FERRUM OR TRUE IRON.

Ferrum is the Latin as well as the chemical name for iron. In its chemical sense it means pure iron, in distinction to the common word, iron; because all the iron of commerce is not pure iron, but a compound of iron and charcoal. Iron and steel vary only according to the quantity of charcoal combined with the iron. Pure iron, *i. e.*, ferrum, is never seen but in a laboratory or chemical museum; there is, however, no substance perhaps so widely and universally diffused as ferrum, in combination with this and that, throughout the world's surface. Iron exists in almost every soil; it can can be traced in almost every plant and fruit. It not only exists in animals. but its quantity is so regular in the human blood, that ferrum is now considered one of its natural constituents; in fact, physicians distinguish healthy blood by the amount of iron it contains. The manifold uses of this truly precious metal render it more valuable to man than any other metal, and from the numerous and important applications to which it is put, it appears almost indispensable to the condition of civilization. Its frequent mention in Scripture indicates the early period at which man became acquainted with its qualities. All kinds of tools and implements, such as the ax and the harrow, are mentioned in the Bible; and also even some things which are almost considered to be modern inventions. Thus, King Og, of Bashan, is described as having a "bedstead of iron." The "iron pen," is also twice spoken of, but that refers to an instrument used for "graving, not writing, in one case, and is used figuratively in the other. Iron gates, iron chariots, and iron pillars are also mentioned, sufficient to show that nearly all the applications of iron of our day date from ages ago. The mechanical uses of iron are innumerable, from the ponderous engine to the lady's needle: from the pit saw to the surgeon's lancet. The chemical properties of iron are equally numerous. Its presence gives color to many precious stones; the garnet, the ruby, the lapis-lazuli, the topaz, all owe their tint to ferrum. Many artificial colors and pigments owe their brilliancy to iron, such as Prussian blue, which is a compound of iron. Even the ink with which we now write is a compound of iron; and so we may go on enumerating its value to the currier, dyer, and druggist—a long chain of many curious links. Independently of the precious mechanical qualities and chemical properties of iron, there appears something so mystical in its nature, that man's study of it reveals only the more to his astonishment. Of these mystical qualities, none is more mysterious than that of its magnetical properties, and its power, when poised, to set itself at right angles to the motion of the earth's rotation which we call "polarity." What a mass of mystery is there in that little balanced needle by which the mariner directs his course over the foaming wave to a port unseen and unknown:

> "Hail, adamantine steel, magnetic lord,
> King of the prow, the plowshare, and the sword!"

Ferrum yields up its strength and its might to water made sour with sulphuric acid. In this liquor iron dissolves and becomes invisible. When the solution is saturated with iron and then evaporated, a beautiful salt (sulphate of iron) is produced, which crystallizes like bits of broken frozen sea.

S. PIESSE.

ACTION OF HEAT-DIFFUSERS

We condense the following very useful remarks from the London *Mechanics' Magazine*; they were written by A. A. Taylor, of Marseilles:—

"Mr. Wye Williams and others have found that an increased effect was produced by the fuel burned in steam-boilers when what have been called heat-diffusers were placed in the tubes or flues. The apparatus in question consists generally of metallic bands or ribands twisted into spirals or bent in the direction of their length into zigzag forms, and placed in the tubes or flues; the professed object of this addition being to break up or disturb the current of heated gases passing through the tubes, and to cause every portion of the gases to impinge on the heating-surfaces; the cause given for the increased effect produced being, that when a current of heated gases passes through a tube under ordinary circumstances, only the exterior portions of the columns come in contact with the sides of the tube, and that in thus disturbing the current by obstacles to its direct course, a more perfect contact of the gases with the surface is produced. But gases do not radiate the heat which they contain, so that the only mode in which a gas can communicate its heat to a surface is by contact or connection. This is, in the present practice, the only mode in which those heating-surfaces of a boiler which are not exposed to the radiation of the fire or flame can abstract heat from the products of combustion; but if, in a flue or tube, a solid body be introduced, it will become heated by contact with the gases, and will radiate the heat thus received to the sides of the flue. Now these diffusers, &c., exactly fulfill these conditions, and their effect is mainly, if not entirely, owing to the function which they must fulfill in absorbing heat from the gases by contact, and then radiating this heat to the sides of the tubes or flues; and the amount of heat thus conveyed to the water may be very important, when it is considered that the temperature of the gases in the tubes of a boiler at five or six inches from the fire-box tube plates is about 800° Fah., and that these radiators will consequently have a temperature of several hundred degrees above that of the surfaces in contact with the water in the boiler, and that a very active radiation must consequently take place from one to the other. This principle once established, the modes of application in practice are, of course, endless; and we do not see any advantage in making these radiating surfaces of such a form as to impede the draught, especially in the case of marine boilers, but would rather choose the form which would give the greatest amount of radiating surface, and offered the least impediment to the free passage of the products of combustion through the tubes. Perhaps as effective a form as any for placing in the tubes of boilers would be a simple straight band of metal, or a wider band bent in the direction of its breadth, at an angle of 60°. In the case of marine boilers, they should be made so as to draw out easily, to enable the tubes to be swept."

MODEL OF SOLOMON'S TEMPLE.—We stepped into Temple Hall (formerly Doctor Van Zant's church) in Ninth-street, to take a glance at this exhibition, with a strong feeling that we should see a sort of paste-board puppet show, but we were quite agreeably disappointed. There is hardly any one who would not give 25 cents for a clear, full, and distinct idea of the size and appearance of Solomon's Temple, and ten minutes inspection of the model now being exhibited as above, will go farther to give him this idea than hours or weeks of reading.

A COLUMN OF FACTS IN RELATION TO METEORS.

Several persons have been struck dead by stones falling from the heavens: for instance, a monk at Crema, on the 4th of September, 1511; another monk at Milan, in 1650; and two Swedish sailors, on board ship, in 1674.....Meteors, shooting stars, and aerolites, are now generally regarded as the same thing.....On clear nights, the number of shooting stars which may be seen from one point of observation averages about eight per hour. .....When we consider that a fall of stones would not be noticed if it occurred in half of North America, three-fourths of South America, one-fourth of Europe, three-fourths of Asia, seven-eighths of Africa, and nine-tenths of the ocean, and connect this consideration with the list below of those which have been observed, we may understand that the earth is being almost constantly pelted with these flying rocks.....Shooting stars are apt to appear in great numbers in August and about the middle of November.....Humboldt thought that the observations of the sun's disk which have been noticed may have been caused by masses of these little planets coming between us and the sun.....Professor Pierce says that the meteor of 1783 was half a mile in diameter, and moved at the rate of 20 miles in a second; this is 60 times greater than the velocity of a cannon ball.....The word "meteor" is derived from the Greek word *meteoros*, meaning high, sublime.....Pliny gives an account of the fall of three large stones in Thrace, 452 years before Christ.....A stone weighing 260 pounds fell at Ensisheim, Upper Rhine, Nov. 7, 1492.....Carden Varat mentions the fall of 1,200 stones near Padua, in Italy, in the year 1510; one of them weighed 120 lbs., and another 60 lbs.....A stone weighing 59 lbs. fell on Mount Vaise, France, Nov. 27, 1627.....In January, 1706, a stone of 72 lbs. weight fell near Larissa, Macedonia.....A stony mass fell at Niort, in Normandy, in 1750.....Two large stones, weighing 20 lbs., fell at Liponas, in Bresse, September, 1753.....A shower of stones fell at Plunn, in Bohemia, July 3, 1753.....Two stones, weighing 200 and 300 lbs., fell near Verona, in Italy, in 1762.....A stone, weighing 7½ lbs., fell at Luce, France, Sept. 13, 1768.....There was an extensive shower of stones in the environs of Agen, France, July 24, 1790.....There was a shower of stones near Boquefat, France, in July, 1789.....A stone, weighing 10 lbs., fell in Portugal on Feb. 19, 1796.....There was a shower of stones at Benares, East Indies, Dec. 19, 1798. .....A stone, of 56 lbs. weight, fell at Wold Cottage, Yorkshire, England, Dec. 13, 1795.....A stone, weighing about 20 lbs., fell at Sale, in France, March 17, 1798.....On April 26, 1803, several stones, weighing from 10 to 17 lbs. each, fell near L'Aigle, in France. A large stone fell near Glasgow, Scotland, April 5, 1804.....Dec. 14, 1807, a number of stones fell at Weston, in Connecticut.....April 19, 1808, a stone fell at Bengo San Domino, Italy.....1808, May 22d, a stone, welghing four or five lbs., fell at Stanen, Moravia.....1808, April 3d, a stone fell at Lissa, Bohemia. .....1809, June 17, a stone, weighing 6 ounces, fell on board of an American vessel in lat. 30° 58′ N., lon. 70° 25′ W.....1810, Jan. 30th, a number of stones, some of which weighed about 2 lbs. each, fell in Caswell county, North Carolina.....In July, 1810, a great stone fell at Shahabad, India, which burned five villages and killed several men and women.....August 10, 1810, a stone, weighing 7¾ lbs., fell in county Tipperary, Ireland.....Nov. 23, 1810, stones fell at Mortelli, Villerai and Moulinbrule, France; one of these weighed 40 lbs., and another 20.....March 12, 1811, a stone, weighing 15 lbs., fell in the province of Pultowa, Russia.....July 8, 1811, a number of small stones, one weighing 3¼ ounces, fell near Berlanguillas, Spain..... April 10, 1812, a shower of stones fell near Toulouse, France.....April 15, 1812, a stone of the size of a child's head fell at Erxleben.....August 5, 1812, stones fell at Chantonay.....March 14, 1813, stones fell at Cutro, in Calabria.....Sept. 10, 1813, several stones, one of which weighed 17½ lbs., fell at Limerick, in Ireland.....1814, Feb. 3d, a stone fell at Bucharest, in Russia.....Sept. 5, 1814, stones, some of which weighed 8 lbs., fell near Agen, France.....Nov. 5, 1814, a number of stones, of which 19 were found, fell in the Doab, in India.....Feb. 18, 1815, a stone fell in Daralla, in India.....The list could be continued to the present time if we had space.

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IMPROVED MACHINE FOR PICKING MILL-STONES.

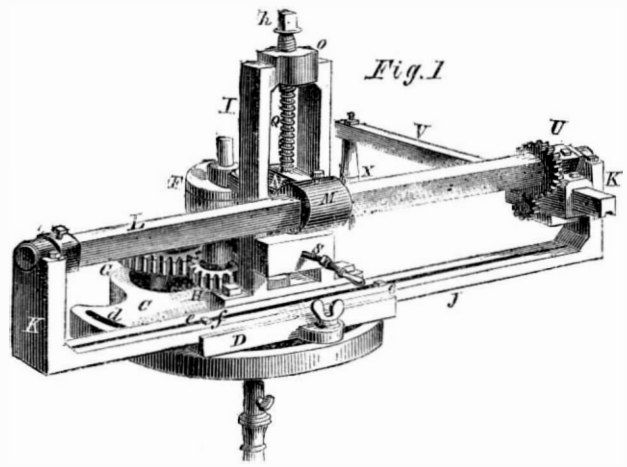
The accompanying cuts illustrate an invention for picking the stones of grist-mills by machinery.

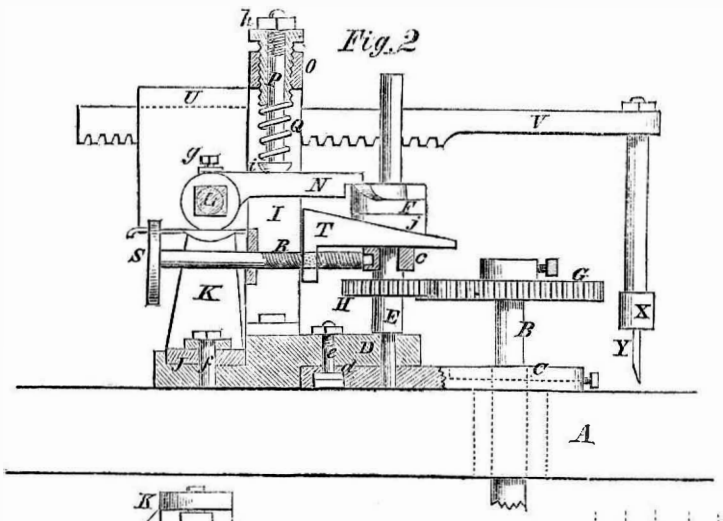
It consists in giving the pick or chisel a hammer motion, and, at the same time, furnishing it with guides by which it may be pushed along so as to cut curved or straight grooves, either radii or ordinates, as may be desired. Fig. 1 is a perspective view of the apparatus, Fig. 2 a vertical section, and Fig. 3 a plan view as seen from above. Y is the chisel secured in the arbor, X, at the end of the arm, V. The arm, V, passes through the head, U, and is held in any position in which it may be placed in the head, by means of a round-toothed pinion and pawl, operating as a very efficient friction brake. The head, U, is slipped upon the rocking-bar, L, which, by rocking, imparts the hammer motion to the chisel. The bar, L, is rocked by means of the arm, N, the end of which rests upon the cam, F, which is so shaped as to gradually carry up the end of the arm, and then allow it to drop perpendicularly. The adjustible spiral spring, Q, presses the pin, *i*, upon the arm, N, and gives an increased rapidity to the hammer motion.

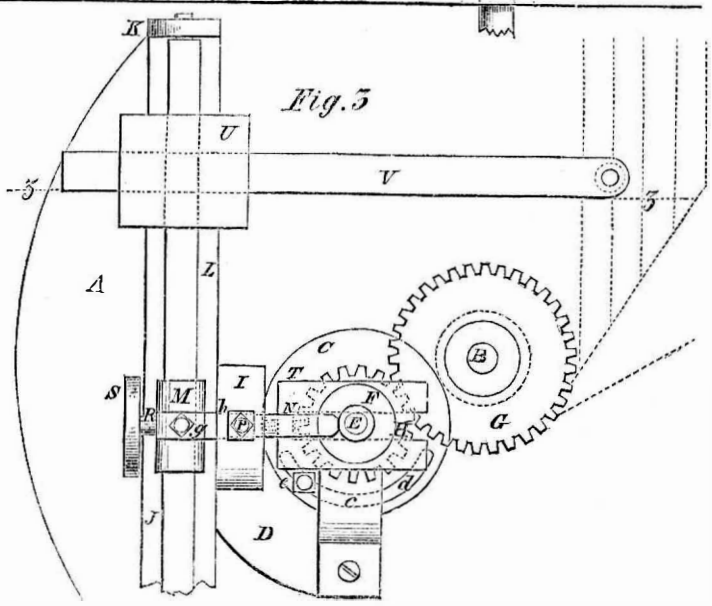
In order to adjust the force of the blow, the cam, F, is slipped loosely upon the shaft, E, so as to permit a vertical movement of the cam; the cam being rotated by means of a lip in its bore which fits into a groove in the shaft; thus, the cam, resting upon the inclined plane, T, may be raised or lowered by pushing forward or withdrawing the inclined plane, which is done by turning the screw, S. The several parts of the apparatus described are supported on a base, D, which is connected with the plate, C, by means of the shaft, E, and of the thumb screw, *e*, moving in the curved groove, *d*, in such manner that the base, D, may be turned about the shaft, E, as a center. The plate, C, is fastened to a collar about the spindle, B, in the middle of the stone, which collar is secured to the stone or its bushing. The rocking-bar, L, is supported in a frame, J K K, which slides horizontally in a groove in the base, D, and this motion, together with those of the bar, V, one through the head, U, and the other along the rocking-bar, L, and the movements of the base, enables the chisel t be brought to all parts of the stone. Fig. 3 shows the mode of cutting grooves in the lines of sines or ordinates; for cutting one groove the head, U, is pushed along the rocking-bar, L, and when one grove is finished, the bar, V, is slid through the head, U, a distance corresponding with the distance apart of the grooves. For curved lines, the head, U, is furnished with a swivel, whereby the bar, V, may be swung to give the desired curvature.

The patent for this invention was issued August 30, 1859 (through the Scientific American Patent Agency), to R. D. Nesmith, of Franklin, N. H., who will be pleased to attend to any inquiries for further information in relation to it, which may be addressed to him as above.

NESMITH'S MILLSTONE-PICKER.







IMPROVEMENTS IN TANNING WANTED.

In a recent lecture delivered by the Hon. Gideon Lee, and published in the *Shoe and Leather Reporter* he gives some very useful hints on the nature and principles of the tanning art. We will quote some of his remarks, because they deserve to be disseminated throughout the length and breadth of the land:—

"The whole process of converting raw hide into leather was once supposed to be merely mechanical. Chemical affinity and chemical combination were not known, and but rarely suspected, in the formation of leather. The French chemists, about 40 years ago, first discovered, and the English and American chemists have since confirmed the fact, that the formation of leather is distinctly chemical. It is now believed to be the chemical union of two distinct principles or elements; the one being the long-known animal gelatine, which constitutes the body and substance of all raw hides and skins; the other, the more recently discovered vegetable substance, the identity of which was first ascertained and made known to the world by Deyeux, a French chemist, and by him named *tannin*. It is the chemical union or combination of this tannin with the gelatine or glue of the hide that forms the insoluble substance which we call leather. The manufacture of leather has probably suffered more from the want of this knowledge (and is still suffering, for I find few tanners that are now willing to admit a chemical combination in its full extent) than from all other hindering causes put together. The still prevailing idea is at least with a large portion of the tanners, that the tannin merely fills up the open pores of the hide, as mechanically as the mason's mortar fills the interstices of a wall, or as the shoemaker's threads or pegs fill the awl-holes.

"I may remark here, that when a hide is freed from the hair, flesh, and other extraneous appendages (which operation, as well as the labor of handling and finishing off, I need hardly say, are mechanical operations), it is composed of unmingled gelatine, and the whole may be reduced to glue. Many tanners have a mistaken notion that the glutin forms one portion, and the fibers another portion of the hide. The glue-makers, however, find the whole substance of the hide reducible to glue, after the cleansing preparatory process I have already described has been done.

"I have said that the process of the formation of leather, from the moment the prepared hide or skin comes in contact with the "ooze" (the solution of tannin), until it is perfect leather, is a purely chemical operation. It is the creation of a new substance by means of the chemical operation; it is the creation of a new substance, by means of the chemical union of two pre-existing elementary substances. The chemical affinity of these two elementary substances, when both are in a state of solution, or in a state of approximate solution, and the suddenness of the union, when no obstacles intervene, almost surpasses description. In confirmation of this powerful affinity, it is related of one of the French experimenters, while the dispute ran high as to the predominance of the mechanical or chemical powers in this manufacture, that having prepared a warm solution of glue in one vessel, and a solution of tannin in another, and pouring the two into a third, he was in ecstacies at the result, when the instantly-rising vapor carried to his olfactories the strong odor of leather. It is believed that the chemical proportions of these elementary constituents (pure glutin and pure tannin), in forming such union, would naturally be about 46 of tannin to 54 of gelatine, both being in a state of solution. It would seem to be a fair corollary, then, that unequal quantities only would unite, and the excess of either would remain a separate residuum; and if this theory be correct, if nearly equal quantities be the ruling law of this chemical combination, it would seem another fair conclusion that each pound of perfectly dried hide should make nearly two pounds of leather—that is, it should incorporate or combine with itself nearly an equal weight of tannin. I have expressed the opinion, that if we could bring the tannin into immediate contact with every part and particle of the prepared hide at once, interior and exterior, our gain in weight would be about 80 per cent.; and that, in the necessary delay during the several months' process, a portion of the softened hide, which is kept in a state of *divorce* from the object of its strong and natural affinity, utterly goes to waste or loses its capacity ever to unite with the tannin, or it imperceptibly becomes extinct. Some portion, however—and, in some instances, a large proportion—of this waste of gelatine occurs in preparing the hide before it comes to the handler."

In these extracts we have related the science and practice of a distinguished tanner; and he clearly informs the public (especially the tanning public) the present defects in that art. Here, then, is a field for improvement—a broad, open and inviting prospect for experiment and invention.

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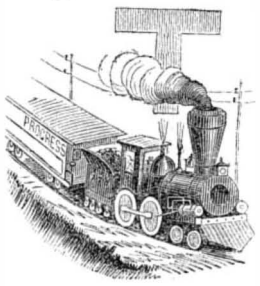
VOL. I., No. 24.....[NEW SERIES.]..... *Fifteenth Year.*

NEW YORK, SATURDAY, DECEMBER 10, 1859.

COMPLETION OF OUR FIRST VOLUME.



THE first volume of the new series of the SCIENTIFIC AMERICAN will be finished by the issue of two more numbers, the last of which will be dated Dec. 24. The fourteen years during which our paper has been published have witnessed a more rapid advance in science and art than any other fourteen years since the world began. It is a law resulting from the nature of the human mind, that its steps in the acquisition of knowledge shall be moving with perpetually increasing velocity. All accumulations of knowledge facilitate the obtaining of new truths; the more a man knows of any subject the more easy it is for him to learn any further fact in relation to it; a man familiar with machinery will easily understand the devices of a self-operating mule from five minutes inspection, while it will require several hours study by one wholly unacquainted with mechanism to fully master these complicated contrivances; the learning of a new language is an easy task to the philologist who is master of a dozen tongues, compared with the labor required for the same purpose on the part of a person who is acquainted with but one. The same law holds in every department of knowledge, and is applicable to the race as well as to the individual. The modern student of nature has the advantage over his predecessors, not only from the possession of superior instruments of observation and measurement, but also from the great mass of information which has been accumulated by those who have gone before him. The establishment of this law justifies the inference that the progress of man in his knowledge of the forces of nature, and the properties of matter, and consequent mastery over them, will continue to increase in rapidity and extent throughout the future, as it has throughout the past history of our race.

It is not only in the number of new discoveries that we find cause of congratulation, but also in their character. From the earliest ages the great intellects of the world have been turning their attention more and more to those facts which might promote the happiness of the human race. The philosophers of ancient Greece disdained all useful knowledge, as unworthy of their attention; while the principal service which Bacon performed was the able, clear demonstration that this is the very kind of knowledge which is most worthy the attention of a philosopher. It is with a sentiment of national pride that we are able to make the boast, that in this kind of discovery our own country is pre-eminent above all the other nations of the earth. Leaving the consideration of metaphysical abstraction to the dreams of the old sleeping nations, the minds of our people, stimulated to intense activity by the life of our democratic institutions, are teeming with countless new devices for facilitating the operations of industry, and multiplying the means of human enjoyment. It has fallen to our lot to be the principal medium for collecting and disseminating these new ideas. Situated in the center of American life, we receive from our innumerable correspondents, scattered from Maine to California, and from Minnesota to Texas, the first crude suggestions which occur to their thoughts; and when these have been elaborately adapted to the properties of matter, and to the wants of the age, and have, through the matchless facilities of our fraternal government, received the protection of law, we proclaim their merits and send them forth to their beneficent work, giving strength to the arm or speed to the foot, and bestowing in one day a reward for the labors of many.

Our journal has recorded, during the brief period of its existence, the discovery of the use of ether for preventing pain in surgical operations, the greatest of all discoveries for the relief of human suffering; the introduction of the electric telegraph, and its extension all over the civilized world; the invention of the sewing-machine, which has done more to improve the condition and elevate the character of the better half of the human race than any other invention ever made; not to mention the reaping machine, the vulcanizing of india-rubber, and thousands of other improvements, which are now performing an important part in the daily life of the world, and contributing immeasurably to the convenience and happiness of mankind.

We are now entering on a new period, and casting our thoughts forward to discoveries which the next fourteen years will bring forth. Though it is difficult to realize it, we confidently predict that these will not be less numerous and important than those of the corresponding period past. What they will be, of course, no man can foresee; perhaps some ideas now dimly suggested may be developed to perfection, and very likely, many things now wholly undreamed of may come forth to startle the world, more even than any of the brilliant discoveries of the last two decades. Whatever discoveries the future may produce, the readers of the SCIENTIFIC AMERICAN may be sure of receiving the earliest and fullest account of them, rendered intelligible by the only mode in which such things can be rendered intelligible, that is, by ample illustrations. While we shall continue to firmly maintain the practical character which our paper has always had, the increased space in our new series enables us to make a brief mention of new discoveries in every department of science, confining ourselves, however, principally to facts, and not cumbering our pages with improved hypotheses; and thus to make it a complete cotemporary record of the conquests of the human mind—its conquests over the darkness of ignorance, as well as over the universe of matter.

DEATH OF WASHINGTON IRVING.

A great and good man has gone to his rest. Washington Irving is now sleeping in "the narrow house appointed for all living." His decease took place in his residence, at Sunnyside, near this city, on the 28th ult. He had been in his usual health during the day, and had spent the early part of the evening in cheerful conversation in the bosom of his brother's family; but on retiring to his bedroom, he suddenly fell forward and the wheel of life ceased its revolutions forever. He was born in New York in April, 1783, and had therefore lived nearly 77 years. His life appears to have been more happy than that of most literary and distinguished men. In disposition he was cheerful, loving and kind; he had many true and pleasant friends, and his years passed sweetly along from youth to the day when his eyes closed on life evermore. Great were the changes which he had witnessed in the character of our Knickerbockers and the face of the country during his life, and of these he has left a record in his "Sketch Book," which made him famous throughout the world. No name is more endearingly familiar to our people than that of the author of "Sleepy Hollow"—his master-piece of mental painting. Old Rip Van Winkle—that strange character which his magic wand awoke from the slumber of a past age—is known to every child in the land. Having spent the sunny days of his youth among the old Knickerbockers, he delighted to dwell upon their simple and honest ways. He has been called the Goldsmith of America, and assuredly he was the most national of all our authors, for he has left us some of the most droll, unique and exquisite pictures imaginable of the old New Yorkers. Their quaint customs, their honesty and sturdy conservatism, he has made immortal. As a writer he was sweet, humorous and elegant. His wit was broad, but never vulgar—his touches are all chaste and classic. When young and engaged in mercantile transactions in Europe, he was suddenly thrown upon the resources of his mind and pen to earn a livelihood. In such circumstances he found the London publishers cold and backward. It was then that his friend, Sir Walter Scott, secured for him that attention from publishers which he deserved, and the kindness of the "Wizard of the North" he never forgot. As a writer of biography his "Life of Columbus" is not surpassed, and all his literary works (of which there are quite a number) bear the marks of a master mind. He was of a handsome person and very fascinating in conversation. Genial in disposition, and deeply sympathetic in his feelings, his presence exerted a happy influence wherever he went. In the village where he resided he was the Nestor and peace-maker. Being loved and respected by all classes for his gifts and virtues, the nation mourns his departure, as a noble and great countryman, and his personal friends as one they "ne'er shall look upon his like again."

ALMANACS.

Who is not interested in almanacs? Many an old lady in the country finds them the principal source of her reading, and even in this enlightened land not a few turn to the almanac prognostications in regard to the weather, with a lingering half faith in their fulfillment. In the last generation, a famous quaker preacher, Elisha Thornton, who lived in the north part of Rhode Island, used to publish an almanac every year, and, though the cardinal virtue of the worthy old man's religion was truthfulness, he inserted in his almanac the usual predictions concerning the weather. At one of the quarterly meetings of the "Society," an elderly friend from a distance took Elisha Thornton to task for the non-fulfillment of his prophecies. He said: "I looked in thy almanac on the fifth day of the ninth month and it said '*rain.*' but it did not rain that day; it was fair." The old saint heard him through with the patience characteristic of his people, and quietly remarked: "Is thee so simple as that?"

In the last century, in England, the monopoly of the trade in almanacs was enjoyed, by virtue of royal Letters Patent, by the two great Universities of Cambridge and Oxford, and by the Stationers' Company. The books were all stamped with the license of the Archbishop of Canterbury. With all this academical, royal and ecclesiastical authority, what does the reader suppose was the character of those works? The most impartial native historians inform us that they were characterized by extreme ignorance, imposture and obscenity. A reform has since taken place, and now there are almanacs of the very highest character, in England, Scotland and Ireland. The English "Nautical Almanac," especially, has a world-wide reputation, and has been exclusively used by our own navigators until very recently. A few years since, Capt. C. H. Davis, U. S. N., embarked with great ardor and energy is the enterprise of producing an American nautical almanac. Through the powerful aid of Professor Peirce and of the late Sears C. Walker, he succeeded. The first volume, for 1855, appeared in 1853, Nautical almanacs are always published in advance, in order that they may be taken to sea for long voyages. The American "Nautical Almanac" is pronounced by competent judges to be equal. and in some respects superior, to the nautical almanacs of either England, France or Germany.

The old "American Almanac," which contains 357 pages, and has reached its 28th year, is crowded with information, useful and interesting to the great mass of the American people. It contains tables of the officers of the general government, and all the state governments, with their salaries and terms of office, for the year; tables of the exports and imports of all the principal articles of commerce; very full astronomical and meteorological information; obituary notices of eminent Americans; and a vast mass of other facts in relation to the country. The old "Farmer's Almanac" has been published in Boston for 68 years. We notice that the number for 1860 presents the same general appearance which this publication has borne ever since we can remember. There is one omission, however: the figure of a man with an indication of the constellations relating to different parts; this is one of the superstitions borrowed from the old European almanacs, and which has disappeared with the spread of intelligence and consequent elevation of this department of popular literature. Indeed, the history of almanacs during the last 200 years furnishes the most striking proof of the very rapid progress which the mass of the people, throughout the civilized world, are making in intellectual and moral elevation.

WE hope none of our readers will fail to read the interesting series of articles, entitled "Important Hints on Ventilation," written by E. M. Richards, C. E., and commenced in our last issue. They are worthy of the careful perusal of every one.

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DEATH OF PROFESSOR TURNER.

The Patent Office has just met witb a serious and almost irreparable loss in the death of Professor Wm. W. Turner, librarian of that office, and formerly teacher of oriental languages in the Union Theological Seminary, of this city. He died on Tuesday, Nov. 29th, and his funeral was attended by his brother-officers in a body. They had previously had a meeting to express their sympathy and respect, on which occasion the following paper was read by Dr. Foreman, one of the Chief-examiners in the Patent Office:—

"Professor Wm. W. Turner came to reside in this city in the spring of 1852, at the invitation of the Hon. Thos. Ewbank, at that time Commissioner of Patents. He accordingly resigned, in the Union Theological Seminary of New York, his professorship of Hebrew, Arabic, and other oriental languages, which he had for many years filled with distinguished credit. Previous to this, however, he had finished one of his prominent literary engagements, which consisted in translating the 'Latin and German Dictionary of Freund, from the letters D to Z, for the edition of that great work published by Dr. Andrews, in the preface of which his share in the preparation of the work is properly acknowledged.

"His connection with the library of this office began soon after his arrival, and the influence of a master mind was immediately apparent in his success in reclaiming it from the disorder and neglect into which it had fallen. To his great knowledge of books, his untiring assiduity as librarian, and the discreet expenditure of the small fund appropriated, are we now indebted for one of the most complete technical libraries in the world. His education and all the pursuits of his life combined to give him a knowledge of the most minute details of books, not of their literary contents alone, but of the typography, binding, cataloguing, and everything relating to the publication and arrangement of books.

"His aid was constantly in requisition by persons transacting business in the office, for translations from the modern languages; and it was no uncommon thing to witness conversations between him and learned foreigners, who visited the library, in their native languages, whilst upon his desk lay a volume in the Russian or the Persian language, from which he was making translations, or probably from the Hebrew or Arabic, which were long his favorite subjects of study. We do not recall these familiar traits to swell the report of our friend's attainments, but as evidence of his extensive and thorough knowledge.

"In the learned volumes of the Smithsonian contributions to knowledge may be seen the great reliance placed upon Professor Turner's skill in languages by the distinguished officers of that institution. All questions relating to, or memoirs submitted on, the aboriginal languages of North America were confided to his judgment and editorial supervision. As an instance, may be named the 'Dictionary of the Dacotah Language,' which forms an entire volume in the series. More recently, the 'Grammar and Dictionary of the Yoruba' (an African language), in the latest volume of the above contributions, was edited by him; and the published acknowledgement of the institution shows that both of these works, when passing through his hands, became almost new works, in consequence of the labor he bestowed upon them. A similar remark is admissible relative to the new edition of Bartlett's 'Dictionary of Americanisms.'

"One of the labors of his life was the translation of an inscription in very ancient Hebrew, sculptured in Phœnician characters on the sarcophagus of a king of Sidon, disinterred about four years ago on the Syrian coast. The difficulty of this work was so great that but few persons living could undertake it, and only those who were familiar with the language of the old Hebrew Scriptures. Of the small number of versions which have been published, Professor Turner's is regarded as equal to, if not surpassing, any one which has appeared.

"In closing this hasty sketch of the labors and wonderful attainments of our friend, we are very sensible how far it falls short of telling all that has been accomplished by one of the brightest minds we have ever known, coupled as it was with unrelaxing habits of study. To these habits, alas! we feel that we owe his death. An overtasked brain, a year or two since, brought on a complicated organic disease which has hurried him out of existence, before half his hopes were fulfilled or half the plans of his life were accomplished. A few days ago and he was at his post, busy and cheerful; but, to-day, we see the accumulated knowledge of a whole life, the skillfully-trained mind with its wonderful treasures, all turned to dust! We bow before the inscrutable Power which permitted that mind to grow up and flourish, but which has just suddenly destroyed the magnificent fabric, and left nothing in its place but death and desolation."

SCIENCE AND ART.

Sir David Brewster, the new principal of the University of Edinburgh, in his address at the opening of the Winter Session, on Nov. 2d, said:—"It is necessary to warn you against speculations morally and intellectually degrading. In the blue heavens above, in the smiling earth beneath, and in the social world around, you will find full scope for the exercise of your noblest faculties, and a field ample enough for the widest range of invention and discovery. Science has never derived any truth, nor art any invention, nor religion any bulwark, nor humanity any boon from those presumptuous mystics who grovel amid nature's subverted laws—burrowing in the cavern of the invisible world, and attempting to storm the awful and impregnable sanctuary of the future. The sciences of zoology, botany, geology, and mineralogy, including the structure and physical history of the earth, constitute one the most fascinating studies, and one which even fashion has introduced into many intellectual households, where *aquaria* or *vivaria*, the nurseries of interesting plants and animals, decorate the library and the drawing-room. Studies of this kind, which can be pursued for health or for pleasure, require like preparation for the mind. They are associated too, with many of our wants and amusements, and find frequent and useful applications in the various conditions of life. In no other University in Scotland can these subjects be so favorably suited as in this, amid its magnificent collections in zoology, botany, and mineralogy. There is only one other branch of study to which I am anxious to call your attention. The advances which have recently been made in the mechanical and useful arts have already begun to influence our social condition, and must effect still more deeply our system of education. The knowledge which used to constitute a scholar, and fit him for social and intellectual intercourse, will not avail him under the present ascendancy of practical science. New and gigantic invention smark almost every passing year—the colossal tubular bridge, conveying the monster train over an arm of the sea—the submarine cable, carrying the pulse of speech beneath 2,000 miles of ocean—the monster ship freighted with thousands of lives—and the huge rifle gun throwing its fatal but unchristian charge across miles of earth or of ocean. New arts, too, useful and ornamental, have sprung up luxuriantly around us. New powers of nature have been evoked, and man communicates with man across seas and continents with more certainty and speed than if he had been endowed with the velocity of the race-horse, or provided with the pinions of the eagle."

NEW SHIP CANAL IN CANADA.—Our northern neighbors are not only distinguished for great and bold projects, but also for successfully carrying them out. The public works of Canada, in proportion to the number of inhabitants in the provinces, are, by far, the greatest on our continent. The ship canal which unites Lakes Erie and Ontario is a work without a rival; the great bridge over the St. Lawrence, at Montreal, is the most stupendous work of the kind in the world; and the Grand Trunk Railway, extending from Quebec to Lake Huron, has no peer in any land. In addition to these great works a new one is proposed for uniting Lake Huron, by a ship canal, with the Ottawa river, thence to Montreal, down the St. Lawrence. Such a canal would carry off all the shipping from the upper lakes connecting the great North-west, as it would obviate the long roundabout navigation of Lakes Erie and Ontario. The route of the new ship canal has been surveyed, and the project declared to be practical, at no very great expense. Our railroad lines communicating with the great North-west must look well to their arrangements, or they will find much of their business going by the shorter northern routes in Canada. The Canadian lines of steamers running between Liverpool and Quebec now from a commanding short connection with Europe and our western States.

TECHNOLOGY AND THE BEAUTIFUL.

In his opening lecture in the University of Edinburgh on the 2d of last month, on the subject—"Technology as a Branch of Liberal study," Professor George Wilson, one of the most distingushed philosophers of the day, said:—"The highest authorities in æsthetics, and the greatest artists, have ever protested against sham adornments, and where they were not fulfilling a purely æsthetic conception, have rejoiced in clothing with grace the most homely things. In so doing they have walked in the way of God. A multitude, perhaps a majority, of created things are not less beautiful than useful. The nodding wheat-stalk, the clusters of the vine-grape, the stately pine, the gnarled oak tree, the granite peak, are as graceful as they are seviceable ministers to our daily industrial wants. A multitude of created things—flowers, and birds, and gems, and stars—are, to appearance at least, simply beautiful; not serving our utilitarian necessities, although it would be folly and impiety to pronounce them useless. The stamp of ugliness nowhere comes before us as the index of utility. Nature hastens as it were on all sides to hide away and put out of sight what is noisome in any way, or unwelcome to the senses. Nay, she does more than conceal offensive things; she changes them, while she uses them, into forms of beauty. The daisies grow thickest over the graves of the dead. The battle-fields of Inkermann and Balaklava have long been distinguished only by the multitude of the flowers that spangle their thick grass. Already Solferino is growing green again, and except that the mulberry will wear in spring a richer foliage, and the silkworms revel more greedily on their leaves, you will look in vain for traces of the awful slaughter. If human industrialism cannot often imitate this divine example, it is want of skill and want of wealth, much more than want of will that occasions the failure."

LAMP-POST LETTER-BOXES.—The street letter-boxes, illustrated on page 26, of the present volume of the SCIENTIFIC AMERICAN, are now being attached to the lamp-posts in this city. This improvement relating to the reception of city letters, has worked admirably in Philadelphia, the city where it was first adopted; and we have no doubt but it will operate equally as well in this city. It is certainly a great improvement over the miserable old method of keeping tin letter-boxes in corner groceries, and other vulgar places. Old Gotham is waking up to new life and vigor. Her city fathers have lately exhibited an immense amount of common sense and enterprise. Street-sweeping machines, lamp-post letter-boxes, Belgian pavement &c., afford abundant evidence that some of them read the SCIENTIFIC AMERICAN and are exercised in a most delightful and healthy manner thereby, for their own good and that of the "dear" people.

THE PROGRESS OF THE TELEGRAPH.—California papers announce that, in March next, San Francisco will be within 10 days' telegraphic communication with the Atlantic States. This will take place by the simultaneous completion, at that time, of the telegraphic lines between St. Louis and Fort Smith, on the Atlantic side, and San Francisco and Los Angelos on the Pacific side, thus cutting off three-and-a-half days at each end, and with the mail facilities, reducing the time of communication between the Atlantic and Pacific cities to about 10 days. It will not be long therefore, before the telegraphic wires will close the intervening gap, and make the communication between the East and the West instantaneous. This, for the interests of the United States, is more important than even the success of telegraphic communication with Europe.

AN URGENT APPEAL.—We appeal to and hope all our readers whose subscriptions expire with No. 26, will not only promptly renew them, but endeavor to induce others to subscribe for at least six months. The SCIENTIFIC AMERICAN is universally recognized as not only the cheapest, but also the best journal of its class ever issued; and we intend to make it, in future, what it now is—the organ of ingenious men, the mirror of the progress of invention and discovery. For $1, this journal can be had for six months; and the numbers issued in that time will make a volume of 416 pages, full of illustrations and choice reading matter. Will not our friends respond to our call, and send along a few additional names, at once

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FOREIGN SUMMARY—NEWS AND MARKETS.

At a recent meeting of the Manchester (England) Philosophical Society, Dr. F. Grace Calvert, the eminent chemist, read a paper on researches on several organic coloring matters, in which light was demonstrated to play a wonderful and important part in changing and producing colors with various substances. Thus, the solution of a wood in England called "purple-heart" is perfectly colorless, and if exposed in a dark place to the air for several days, it will remain unchanged, but if placed in a glass vessel, hermetically sealed, and then exposed to light, it assumes a purple color. Heat also appears to have a peculiar effect in producing the color, for when a small quantity of hydrochloric acid was mixed with the clear solution of the purple-heart, it remained colorless, but when heated to about 154° Fah., it acquired a purple hue, and when heated to 276° Fah., in the dark, without being mixed with an acid, it also became a deep purple. Woolen, silk and cotton goods, when steeped in a decoction of this wood, were simply colored a light grey, but when exposed to the light and a bath of acidulated water, they were at once dyed a purple. The color withstands the action of acids and is more durable on silks than purples dyed with archil. These researches open up a new field for practical chemists connected with the ornamental arts of coloring. There are, perhaps, many of the common woods in our forests the solutions of which may be capable of coloring purple and other shades. The practical part of chemistry, relating to topical coloring and dyeing of fibrous materials, is exceedingly intricate, and from present chemical knowledge, general laws for the production of organic coloring matters cannot be laid down.

At the above-mentioned meeting a paper was read by Dr. R. A. Smith on the cause of color and the theory of light. He had made a great number of experiments which proved the undulating hypothesis of light to be correct, and which explained many of the mysteries connected with polarization and prismatic refraction. It is believed by men of science that there is a subtile ether pervading space, and that light is caused by its vibrations, and that the different colors of the spectrum are produced by the number of vibrations in a given time in certain media. Dr. Smith's experiments resulted in his concluding that there were greater intervals between the undulations than Newton had demonstrated or scientific men believed. He had made certain contrivances so as to produce light and shade in alternate vibrations, and by thus causing pulsations of white light and of shadow alternately, he produced various colors. If we suppose white light to consist of the motion of an ether, and darkness an entire absence of motion in the ether, then a certain color—red, blue or yellow—will be developed by the alternate action of light and shadow. By taking a piece of white card-board cut in the form of a parallelogram and made to revolve over a black surface with a rapidity considered equal to the vibration of light, a deep blue was produced; with a different velocity a purple was the result. By painting a disk with several rings of black and white alternately, and then revolving it rapidly, the black and white disappeared and the rings became colored. The whole of the colors of the rainbow could thus be produced by simple white light and shadow, alternating with great rapidity.

A very large steam hammer has lately been constructed at Leeds for a railway company in Australia, and it embraces an improved feature for rapid working. The general method of constructing steam hammers has been to raise the hammer by the steam power and allow it to drop by gravity. Of course this principle of action is unsuited to rapid working. This new hammer is constructed upon both the single and double-acting principle; it is not only lifted by the pressure of steam from below, but the natural effect of gravity from the falling of the hammer is assisted by pressure of steam from above. A blow of extraordinary force and rapidity is thus produced, which is of great advantage in forging when a considerable number of blows are necessary, the work being finished at one heat, thus saving both time and fuel. The length of stroke and force of blow can be regulated at the will of the operator, so as to produce blows equal to 16 tuns or a few pounds.

A correspondent of the London *Times* states that, on examining the inside of some iron vessels at Portsmouth, which had become leaky, it was found that the whole of the rivet heads, wherever the wash of the bilge-water reached, had been worn off as cleanly as if cut with a chisel. This had led to the use of a cement for covering the heads of the rivets so as to prevent the water acting upon them. When the rivet heads of iron vessels are not protected inside from bilge-water and grit they are soon worn off. One of the navy troop-ships, called the *Megera*, with an iron hull, has lately returned from abroad and is lying at Portsmouth. Her rivets were not protected by cement, and, as a consequence, thousands of them can now be knocked out of her bottom from the inside, with a common punch. This is very important information for the builders and owners of iron ships.

The English are beginning to use decimal measures. Rules are now made with the old 12-inch measure on the one side, and on the other with 10 inches, corresponding to the old foot. Thus a 20-inch rule is equal to the old 2-foot rule. The term "inch" is retained, that of "foot" abolished.

New York Markets.

CANDLES.—Sperm, city, 38c. a 40c. per lb.; sperm, patent, 50c.; wax, paraffine, 50c.; adamantine, city, 18½c. a 21c.; stearic, 27 a 28c.

COAL.—Anthracite, $4.50; Liverpool orrel, $10; cannel, $12.

COPPER.—Refined ingots, 22½c. a 23c. per lb.; sheathing, 26c.; Taunton yellow metal, 20c.

CORDAGE.—Manilla, American made, 8¼c. per lb.; Rope, Russia hemp, 12c.

COTTON.—Ordinary, 8½c. a 8¾c.; good ordinary, 9¼c. a 10c.; middling, 11⅜c. a 11⅞c.; good middling, 11⅞c. a 12⅜c.; middling fair, 12½c. a 13¼c.

DOMESTIC GOODS.—Shirtings, bleached, 26 a 32 inch per yard, 6c. a 8c.; shirtings, brown, 30 inch per yard, 6c. a7¼c.; shirtings, bleached, 30 a 34 inch per yard, 7c. a 8½c.; sheetings, brown, 36 a 37 inch per yard 5½c. a8¾c.; sheetings bleached, 36 inch per yard, 7½c. a 15c.; calicoes, 6c. a 11c.; drillings, bleached, 30 inch per yard 8¼c. a 10c.; cloths, all wool, $1.50 a $2.50; cloths, cotton warp, 85c. a $1.37; cassimeres, 85c. a $1.37½; satinets, 30c. a 60c.; flannels, 15c. a 30c.; Canton flannels, brown, 8½c. a 13c.

DYEWOODS.—Duty free. Fustic, $18 a $38, according to quality; Logwood, Laguana, $24; Jamaica, $12, Lima wood, $65 a $75; Sapan wood, $45; Bar wood, $22 a $24.

FLOUR.—State, superfine brands, $5.10 a $5.20; Ohio common brands, $5.30 a $5.40; Ohio, fancy brands, $5.50 a $5.60; Michigan, Indiana, Wisconsin, &c., $5.40 a $5.60; Genesee, extra brands, $5.75 a $7.50; Missouri, $5.35 a $7.50; Canada, $5.50 a $6.35; Richmond City, $6.50 a $7.25; Baltimore (Howard-street), $5.50 a $6.25; rye flour, fine, $3.75 a $3.90; corn meal, $4

HEMP.—American undressed, $140 a $150; dressed, from $160 a $200. Jute, $87 a $90. Italian, $375. Russian clean, $190 a $200 per tun. Manilla, 6¼c. per lb. Sisal, 5¼c.

INDIA-RUBBER.—Para, fine, 62½c. per lb.; East India, 50c. a 52c.

INDIGO.—Bengal, $1 a $1.55 per lb.; Madras, 75c. a 95c.; Manilla, 60c. a $1.15; Guatemala, $1 a $1.25.

IRON.—Pig, Scotch, per tun, $23.50 a $24; Bar, Swedes, ordinary sizes, $87 $90; Bar, English, common, $42.50 a $43; Sheet, Russia, 1st quality, per lb., 11¼c. a 11¾c.; Sheet, English, single, double and treble, 3⅛c. a 3⅞c.; Anthracite pig, $24 per tun.

IVORY—Per lb., $1.25 a $1.80.

LATHS.—Eastern, per M., $2.50.

LEAD.—Galena, $5.80 per 100 lbs.; German and English refined, $5.65; bar, sheet and pipe, 5¾c. a 6c. per lb.

LEATHER.—Oak slaughter, light, 31c. a 32c. per lb.; Oak, medium, 31c. a 33c.; Oak, heavy, 30c. a 31c.; Oak, Ohio 29c. a 30c.; Hemlock, heavy, California, 20½c. a 21½c.; Hemlock, buff, 15c. a 18c.; Cordovan, 50c. a 60c.; Morocco, per dozen, $18 to $20.; Patent enameled, 16c. a 17c. per foot, light Sheep, morocco finish, $7.50 a $8.50 per dozen.; Calf-skins, oak, 57c. a 60c.; Hemlock, 56c. a 60c.; Belting, oak, 32c. a 34c.; Hemlock, 28c. a 31c.

LIME.—Rockland, 80c. per bbl.

LUMBER.—Timber, white pine, per M feet, $17.50; yellow pine, $35 a $36; oak, $18 a $28; eastern pine and spruce, $13 a $15 White Pine, clear, $35 a $40; White Pine, select, $25a $30; White Pine, box, $14 a $18; White Pine, flooring, 1¼ inch dressed, tongued and grooved, $24.50 a $25; Yellow Pine, flooring, 1¼ inch, dressed, tongued and grooved, $29 a $32; White Pine, Albany boards, dressed, tongued and grooved, $20 a $21; Black Walnut, good, $45; Black Walnut, 2d quality, $30; Cherry, good, $45; White Wood, chair plank, $45; White Wood, 1 inch, $23 a $25; Spruce Flooring, 1¼ inch, dressed, tongued and grooved, each, 22c.a 24c.; Spruce Boards, 15c. a 17c.; Hemlock Boards, 12½c. a 14c.; Hemlock wall strips, 10c. a 11c.; Shingles, cedar, per M, $28 a $35; Shingles, cypress, $12 a $25; Staves, W. O. pipe, light, $55 a $58; Staves, white oak, pipe, heavy, $75 a $80; Staves, white oak, pipe, culls, $30 a $35; Staves, do. hhd., heavy, $70; Staves, do. bbl. light, $30 a $35; Staves, do. bbl. culls, $20; Mahogany—Duty, 8 per cent. ad. val. —St. Domingo, fine crotches, per foot, 35c. a 45c.; St. Domingo, ordinary do., 20c. a 25c.; Honduras, fine, 12½c. a 15c.; Mexican, 13c. a 15c.

NAILS.—Cut at 3¼c. a 3⅜c. per lb. American clinch sell in lots, as wanted, at 5c. a 5½c.; wrought foreign, 3¾c. a 3½c.; American horse-shoe, 14½c.

OILS.—Linseed, city made, 56c. per gallon; linseed, English, 56c.; whale, bleached winter, 59c. a 60c.; whale, bleached Fall, 58c.; sperm, crude, $1.38; sperm, unbleached winter, $1.45; coal oil. $1; lard oil, No. 1 winter, 87c. a 92½c.; refined rosin, 20c. a 40c.; camphene, 45c. a 47c.; fluid, 53c. a 55c.

PAINTS.—Litharge, American, 7c. per lb.; lead, red, American, 7c.; lead, white, American. pure, in oil, 8c.; lead, white, American, pure, dry, 7¼c.; zinc, white, American, dry, No. 1, 5c.; zinc, white, French, dry, 7½c.; zinc, white, French, in oil, 9½c.; ochre, ground in oil, 4c. a 6c.; Spanish brown, ground in oil, 4c.; Paris white, American, 75c. a 90c. per 100 lbs.; vermillion, Chinese, $1.12½ a $1.22; Venetian red N. C., $1.75 a $2.25 per cwt.; chalk, cash, $4 per tun.

PLASTER-OF-PARIS.—Blue Nova Scotia, $2.75 a $2.87½ per tun; white Nova Scotia, $3; calcined, $1.20 per bbl.

RESIN.—Common, $1.50; per 310 lbs.; strained, No. 2, &c., $1.50 a $1.87; No. 1, per 280 lbs. $2 a $3; white, $3 a $4; pale, $4.50 a $5.50.

SPELTER plates, 5c. a 5¼c. per lb.

STEEL.—English cast, 14c. a 16c. per lb.; German, 7c. a 10c.; American spring, 5c. a 5½c.; American blister, 4½c. a 5½c.

SUMAC.—Sicily, $65 a $80 per tun.

TALLOW.—American prime, 10¾c. per lb.

TIN.—Banca, 30c. a 30½c.; Straits, 30c.; plates, $6.37 a $9.50 per box.

TURPENTINE.—Crude, $3.50, per 280 lbs.; spirits, turpentine, 40c per gallon.

WOOL.—American, Saxony fleece, 55c. a 60c. per lb.; American full blood merino, 48c. a 52c.; extra, pulled, 45c. a 50c.; superfine, pulled, 39c. a 43c.; California, fine, unwashed, 24c. a 32c.; California, common, unwashed, 10c. a 18c.; Mexican, unwashed, 11c. a 14c.

ZINC.—Sheets, 7¼c. a 7½c. per lb.

The foregoing rates indicate the state of the New York markets up to December 1st.

Flour has advanced; tin and resin retreated. On the whole, however, the prices have been very steady.

The boot and shoe market is dull and leather inactive. The north and north west regions produce the most leather. During the past week 44,567 sides arrived in the city, of which 25,347 came down the Hudson river. We have noticed considerable quantities of catechu received lately by those engaged in furnishing tanning materials. This East Indian astringent gum is coming into more general use for making leather.

WEEKLY SUMMARY OF INVENTIONS.

The following inventions are among the most useful improvements patented this week. For the claims to these inventions the reader is referred to the official list on another page:—

MUSIC WIRE.

This invention consists in the employment for the strings of piano-fortes and other stringed instruments, of hardened and tempered steel wire, such wire being less brittle and having greater tenaciousness of sound and producing more brilliant tones in the vibrations than the steel music wire heretofore used, which has always been made hard by repeated drawing in a cold state without annealing. J. B. Thompson, of Philadelphia, Pa., is the inventor.

VALVE GEAR.

This invention relates to the direct application of steam to operate the valves of steam engines, and is more especially intended for use in beam engines or other engines with upright cylinders having puppet valves, but it may be applied to any engine whose valves have a vertical motion. It consists in a novel mode of applying an auxiliary steam cylinder and piston in combination with the valves of the main engine, to effect a quick opening and control the closing of said valves. It also consists in the employment of the same steam in such auxiliary cylinder, first to open the valves of the main engine, and afterwards to check and render gradual the fall or descent thereof. And it further consists in certain means of retaining the eduction valves of the main engine in an open condition after the cut-off takes place. The inventor of this device is Peter Louis, of this city.

PIANO-FORTE.

H. Steinway, Jr., of this city, has an important improvement in pianofortes, the object of which is to permit the use of "agraffs" for the tuning-block bearings of the treble strings, and yet to permit the said strings to be struck as close as is desirable to those bearings. The invention consists in the construction of the cast-iron plate which covers or partly covers the tuning-block, with a projection on its under side, to lap over the edge of and abut against the said block; and in screwing the agraffs down from the upper surface of the said plate into the said projection.

BASIN FOR WATER-CLOSETS.

The object of this invention is to effect a more thorough cleaning of the basin after use than has been hitherto done. The invention consists in constructing the upper part of the basin with an annular chamber which gradually decreases in diameter from its orifice to its opposite end, and is so placed relatively to the body of the basin as to cause the water admitted into it to pass down all around the inner side of the basin in a spiral sheet, and thoroughly wash the same. The inventor of this device is Wm. Boch, Senr., of Greenpoint, N. Y.

OFFSET BOXES IN SAWMILL CARRIAGES.

Offset boxes are used on sawmill carriages so that as the carriage is gigged back it shall be thrown from the saw laterally, and thus avoid marring the face of the lumber by the teeth of the saw coming in contact with the same, and also avoid heating the saw. The im-

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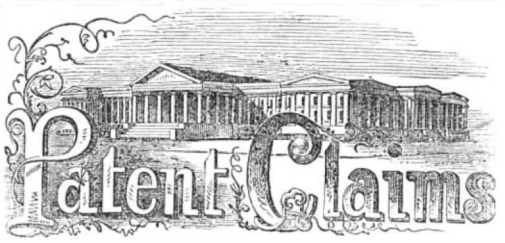
provement consists in a peculiar manner of casting or constructing a pair of offset boxes together on a common bed-plate, so as to avoid a difficulty which has always been experienced in the use of such boxes. The difficullty alluded to is this:—A pair of ordinary offset boxes, owing to being made separate from each other, spread apart, and it is difficult to keep them in line relatively to each other and from spreading apart and thus becoming useless for the purpose intended; but by casting them together on a common bed-plate which has an opening through it to admit the friction-wheel, they have no chance of play independently of each other, and therefore the difficulty is obviated. Wm. M. Ferry, Jr., of Ferrysburgh, Mich., is the inventor.

CAR TRUCK.

The object of this invention is to bring the weight of the car body or cause the same to bear directly over the journal boxes of the axles, and at the same time employ a swinging cross-beam so as to admit of a certain degree of lateral play or movement of the car body independently of the truck, whereby an uneven wear of the journals of the axles is prevented; an easy, yielding capacity given the car, both laterally and vertically, while in motion; and much wear and tear avoided generally in the running-gear and parts intimately connected therewith. The credit of this contrivance is due to F. I. Palmer, of Knoxville, Tenn.

PLANING ATTACHMENT FOR SHINGLE MACHINES.

This invention is to be attached to that class of shingle machines in which a circular saw and reciprocating bolt-carriage are used. The object of the invention is to obtain a planing device that will operate automatically by the movement of the bolt-carriage, and perform the desired work, to wit, the planing of the face side of the shingles as they are sawed from the bolt, without any additional aid or attendance in the manipulation of the machine to which the invention is applied. This improvement was designed by J. E. Sturdy, of Augusta, Maine.



ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING NOVEMBER 29, 1859.

[Reported Officially for the SCIENTIFIC AMERICAN.]

*** Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

26,239.—Reuben L. Allen, of Providence, R. I., for an Improvement in Sleeve-fasteners:

I claim the new article of manufacture described, namely, a sleeve fastening, composed of the spring, A, cylindrical arms, B C, hinge and catch, b c, and hooked bar, D, arranged in the relations and so as to operate together, in the manner set forth.

26,240.—Seth A. Andrus, of Roscoe, Ill., for an Improved Washing-machine:

I claim, first, The combination of the circular plate or crank, I, with the rubber, J, as described, and so constructed and arranged that, by operating the said crank, I am enabled to communicate to the said rubber, J, two motions at the same time—that is, a vertical reciprocating motion and a lateral vibratory motion.

Second, The combination of the caster-rollers, m m′, with the double spring, K, constructed and arranged, in connection with the rubber, J, as before more fully set forth, and for the purposes stated.

26,241.—Evans Backus, of Stuyvesant, N. Y., for an Improvement in Cooking-ranges:

I claim attaching to a stove or range the curved plate, I, and the movable plate, n, and the continuous flue, F, when arranged in the manner and for the purposes set forth.

26,242.—G. W. Beers, of Bridgeport, Conn., for an Improvement in Making Hub Bands for Wagon Wheels:

I claim casting slits or holes through the bands sufficiently large to allow the solder, or other suitable metal used in connecting the cap to the band, to flow through them and unite them, as described, or in any other form or way equivalent thereto.

26,243.—Wm. Boch, Senr., of Green Point, N. Y., for an Improved Water-closet Basin:

I claim, as an improved article of manufacture, a water-closet basin, having a covered annular water passage, B, at its upper edge, as shown and described.

26,244.—Henry F. Bond, of Hudson, Wis., for an Improved Machine for Registering Music:

I claim, first, The application of the bell-pull action with knees and wires to act upon the markers, substantially as described.

Second, The arrangement of the lever, J J J and K K K, by which the sharps are marked with double lines on the spaces or lines in music, with their corresponding naturals, the levers or markers, K K K, being made each of two pieces of tin, or other metal, and the levers or markers, J J J, playing between those two pieces.

Third, The arrangement of levers or markers, of both kinds, in a row, with proper intervals to record the music or paper ruled, substantially as represented in Fig. 6, the staves of music being ruled of one color, with just leger lines enough of another color to write directly up or down from one staff to another, the leger lines between the two staves belonging alike to both of them, and the whole number of lines and spaces being equal to the compass of the instruments.

Fourth, Application of the ink or coloring matter to the cylinder, A, as described, and the producing of colored marks by pressing the paper against the inked cylinder.

Fifth, The action of the lever, E, upon the bar-marker, L, substantially after the manner set forth.

Sixth, The mode in which the loud pedal action is marked, substantially as set forth.

26,245.—S. L. Bond, of Greenwood, S. C., for an Improved Hub-boring Machine:

I claim the V-shaped bars or jaws, F H, in combination with the bit arbor, D, when the whole are arranged substantially as shown, to operate as and for the purpose set forth.

[This invention consists in the combination of an auger or bit and a centering device, so arranged that hubs may be expeditiously and accurately centered and bored for the purpose of receiving their boxes.]

26,246.—James A. Boughton, of Poughkeepsie, N. Y., for an Improvement in Making Hub-bands for Wagon Wheels:

I claim the combination of the flange, C, and projection, D, on the leaf, B, and the set screw, E, in the open band, A, or their equivalent, for the purposes set forth.

26,247.—John Calvin Brown, of Providence, R. I., for an Improvement in Machines for Making Chain:

I claim the circular disk, I, provided with the wedge-formed projections, E F G H, arranged as described, in combination with the bell crank levers, D D′, which operate the several bending instruments, such combination operating in the manner substantially as described for the purposes specified.

26,248.—Peter Brown, of Brooklyn, N. Y., for an Improvement in Paint Cans:

I claim, first, The employment of a strengthening wire within the bead, a, as and for the purpose shown and described.

Second, The combination of the pivoted ears, C, with the cover, B, lug, b, and can, A, as and for the purpose shown and described.

[This can is so constructed that its cover can be fastened down by means of metal strips fastened to the sides of the can, and that the handle can be turned down close to the side of the can so that a number of these cans can be packed up closely, and that each can, when unpacked, can conveniently be carried from place to place.]

26,249.—T. S. Brown, of New York City, for an Improvement in Quartz-crushers:

I claim the employment or use of the tubular pestle, C, having a reciprocating and rotating movement, in connection with the nipple or cone, e, in the box or mortar, D, substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of crushing-machines in which pestles are used for performing the work. The object of the invention is to prevent the pestles wearing uneven by an effect due to the flow of the pulp through the mortar or box in which the pestles work. The invention consists in a peculiar construction of the pestles and employing therewith nipples or cones, whereby the desired end is attained.]

26,350.—John Brubaker and Henry Brubaker, of Lancaster county, Pa., for an Improvement in Tools for Handling Tire:

We claim the rod-handled tong, Fig. 2, with its sliding leg, C, hooked end, a, in combination with the ring, E, Fig. 3, when made substantially as described for the purpose specified.

26,251.—John P. Burnham, of Rockford, Ill., for an Improvement in Harvesters:

I claim the employment of a spring, d, in combination with the lever, J, and connecting rod, L, substantially as and for the purpose shown and described.

[This invention relates to an improvement in that class of mechanism employed for driving reciprocating sickles, in which a cam driving-wheel is used in connection with a lever, arranged in such relation with the cam as to be vibrated by it and impart the proper movement to the sickle. The invention also relates to a novel raking attachment for raking the cut grain from the platform. The object of the invention is to obtain a simple device for performing the desired work, and to guard against accidents which frequently occur in consequence of the sickle being suddenly obstructed in its movement.]

26,252.—Ze Butt, of Lincolnton, N. C., for an Improved Harness Yoke:

I claim the manner described of constructing and arranging the yoke, so that its weight, or the greater portion of it, may rest upon the back instead of the neck of the horses.

I also claim, in combination with the yoke, giving a wide base to the line of draft, either by the bolt and clevis or any other equivalent device, for the purpose and in the manner set forth and described.

26,253.—Andrew J. Chapman, of Scipio, N. Y., for an Improvement in Vegetable-cutters:

I claim the arrangement and combination of the hinged guard or feed-board, hinged follower and stationary slatted cutting-bed, when constructed and operating substantially in the manner and for the purposes set forth.

26,254.—Wm. B. Coates, of Philadelphia, Pa., for an Improved Potato-parer:

I claim the handle, A, ferrules, B and C, guard, D, and blade, G, the whole being arranged and constructed substantially in the manner and for the purposes set forth.

26,255.—Seth L. Cole, of Burlington, Vt., for an Improvement in Gas-burners:

I claim the construction, from some good conducting material, as set forth, of a gas-burner, with an enlargement of the tube at the point where the gas is dischared and burned in the form of a globe, or the like, furnished with a slot aperture, as described, so that the gas shall be heated to the utmost at the point where it is consumed.

26,256.—John Webster Cochran, of New York City, for an Improvement in Breech-loading and other Fire-arms:

I claim, first, So constructing and applying one or more accelerating chambers, in combination with the plunger or elastic cushion, that the charge or charges in the accelerating chamber or chambers are fired by the driving back of the plunger or cushion, and that the plunger or cushion serves as a safety valve to the accelerating chambers, substantially as described.

Second, Combining the movable breech-piece, B, containing the plunger or elastic cushion, with a ring or circular frame, E, hinged to a slide, F, which works longitudinally to the gun, the whole operating substantially as described.

Third, In combination with the breech-piece, B, secured in place by a screw, or its equivalent, I claim the adjustable screwed bushing, G, applied to the gun, substantially as and for the purpose described.

Fourth, The combination of the plunger, C, accelerating chamber, c c, volute spring, D, movable breech-piece, B, ring or frame, E, and slide, F, the several parts constructed and applied to the gun, and operating substantially as described.

[This invention, though it may be wholly or in part applicable to ordnance and small arms of all kinds either breech-loading or muzzle-loading, is more particularly designed for breech-loading ordnance. The nature of the invention consists in a certain construction of, and mode of applying the breech, and mode of combining therewith a spring or elastic cushion, which yields to the force so suddenly developed by the explosion of the charge, by which the following results are produced, viz.: 1st, The projectile is started gently, and the great strain that is produced in the chamber of a gun with a rigid breech before and during the starting of the projectile is obviated, and recoil is in a great measure prevented; 2d, A more perfect combustion of the powder is effected; 3d, Provision is made for lubricating the chamber, breech and bore of the gun; and 4th, One or more accelerating chambers are provided to contain charges of powder for the purpose of giving additional impetus to the ball after it has fairly started.]

26,257.—George Cooper, of Concord, N. H., for an Improved Cooking-range:

I claim the combination and arrangement of the separate leading flues, A B C (each provided with a damper, a b or c, arranged in it as explained), with flues, D E F G H, disposed around the oven, as specified.

And in combination therewith, I claim the separate insulating flues, I K, arranged between the ovens and on opposite sides of the leading flue, A, and made to open into the bottom flues, D and G, and to communicate with the flue, A, by openings provided with dampers, all as specified.

26,258.—P. Davey, of Ironton, Ohio, for an Improvement in Buttons:

I claim the construction of the double flanged shank-piece as the basis of the button, forming on one end thereof a button and on the other a fastening, and in the middle two flange guards, to receive the button hole and protect it from too much abrasion and friction, substantially as set forth.

26,259.—A. A. Dickson, of Anderson, S. C., for an Improvement in Plows:

I claim the arrangement of the peculiar shaped bar, D, with the shares, E F and G, beam, A, and handles, C C, substantially as described for the purpose set forth.

[This invention consists in an improved mode of constructing the plow, whereby the same is rendered extremely simple and durable, and capable of being adapted for various kinds of work.]

26,260.—Patrick H. Duffy, of Somerset, Ohio, for an Improved Detective Register for Watchmen:

I claim dropping the balls, by which the action of the apparatus is indicated, into the cells of a revolving wheel, by operating a rod, O, and slide, Q, substantially in the manner and for the purpose described.

I also claim locking and releasing the rod, O, by devices, substantially as described, whereby it can be pulled at certain times only to drop a ball into the cells of a revolving wheel, when constructed and operated substantially in the manner and for the purpose set forth.

26,261.—Henry Ehrenfeld, of New York City, for an Improved Machine for Converting Reciprocating into Intermittent Rotary Motion:

I claim the plate, B, or its equivalent, arranged with a socket, c, and cut or split through its center, as described, to operate in combination with the wheel, A, and lever, C, which latter is furnished with an oblong pin, d, or its equivalent, substantially in the manner and for the purpose specified.

[This device is particularly intended to give motion to the feed-wheel of a sewing-machine, and it is so arranged that it never fails to impart the required motion to the feed-wheel in one direction, while, in going back, it has no effect whatever on the same. When properly applied, this invention makes a very efficient feed for sewing-machines.]

26,262.—Wm. M. Ferry, Jr., of Ferrysburgh, Mich., for an Improved Journal Box for Saw-mill Carriages:

I claim a new article of manufacture, to wit, a single casting, A, moulded with an intermediate space, B, and with off-setting boxes, C D, on each side of said space, substantially as and for the purpose set forth.

26,263.—Henry Fisher, of Alliance, Ohio, for an Improvement in Railroad Hand-cars:

I claim the manner, substantially as described, of combining the hand crank-shaft, F, with the axle of a railroad hand-car, so that, when the crank-shaft, F, meets with any obstruction, it disconnects automatically from the axle and ceases its revolution with the same, and thus prevents a sweeping off of the operators from the platform, as set forth.

[This invention is designed to prevent the many accidents which result from the use of railroad hand-cars. In using these cars, very often the crank of the driving-shaft catches into the clothes of the operator, and before he has time to free himself, he is swept of the platform on to the track, seriously injured or killed. To avoid these accidents, Mr. Fisher has combined the crank-shaft with the axle of the car, so that the moment the crank catches in the clothes of the operator, or meets with any obstruction, the shaft disconnects automatically form the axle, and thus ceases to be moved round by the momentum of the car. This invention is one which requires no commendation, as it speaks for itself.]

26,264.—Dennis C. Gately, of Newtown, Conn., for an Improvement in the Manufacture of Rubber Belting:

I claim the method described of imparting a smooth and finished surface to belts or bands of india-rubber or gutta-percha, the same consisting in placing them in contact with sheets or strips of vulcanized india-rubber or gutta-percha, and then vulcanize them by applying heat, substantially in the manner and for the purposes set forth.

26,265.—Dennis C. Gately, of Newtown, Conn., for an Improvement in the Manufacture of Rubber Belting:

I claim the manufacture of belting or banding composed either wholly in part of india-rubber or gutta-percha, which consists in vulcanizing the belt or band, and giving it a smooth friction surface at one operation by feeding the belt or band around or in contact with a series of smooth heated rollers, substantially as described.

26,266.—G. A. Gray, Jr., of Cincinnati, Ohio, for an Improved Bench Vise:

I claim the described combination of the handle, G, loose head, F, and catch, H, with the jaws, screws and endless chain of a parallel bench vise.

26,267.—J. H. Green, of Christiansburg, Iowa, for a Composition for Covering Metals:

I claim the composition described.

26,268.—Wm. J. Horton, of La Grange, Ala., for an Improved Machine for Riving Basket Splints, &c.:

I claim the employment or use of the rollers, C C D, three or more, knife, H, placed in the gate, G, and the guide-plates, E E, ar-

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ranged for joint operation, substantially as and for the purpose set forth.

[The object of this invention is to obtain a simple and efficient machine for riving splints for baskets, hampers, and the like; one that may be manipulated with facility, perform its work expeditiously, and be well adapted for southern or plantation use, where large quantities of baskets or hampers are required for the carrying of cotton.]

26,269.—Josee Johnson, of New York City, for an Improved Toy Gun:

I claim, first, So arranging the spring, D, relatively to the bore, A, that D is by a single movement of the finger used both as a trigger and a propelling force to discharge the projectile through A, substantially as shown and described.

Second, I claim in connection with the above, receiving the impact of the spring, D, upon the single bearing, g, so that the free portion of D moves, by its momentum beyond its original position, for the purpose shown and described.

I claim the detaching surface, a, arranged relatively to the spring lever, D, and barrel, A, substantially as shown and described.

26,270.—F. H. Joyner, of Richmond, Vt., for an Improvement in Railroad Switches:

I claim a pair of switches in connection with stationary bearing rails, the whole constructed and arranged as described.

26,271.—Bernhard Koegel, of New York City, for an Improvement in the Manufacture of Vinegar:

I claim converting wine or other alcoholic liquors rapidly into vinegar, or acetic acid, by means of pumice stone, or its equivalent, substantially as described.

I also claim the tub or apparatus, substantially as described, when pumice-stone is used in the same, for the purpose as set forth.

26,272.—J. M. Lamer, of Eufaula, Ala., for an Improvement in Apparatus for Taming Horses:

I claim the employment of the straps, A A, loop, F, and straps, D C, and E, when the same are constructed, arranged and used substantially as and for the purpose specified.

26,273.—Oliver Lindsay and Robert F. Strean, of Washington, Pa., for an Improvement in Grain Fans:

We claim the combination of division-boards, A, with the inclined plane B, the screen-board, G, and riddles, C and F, when the same are united in the peculiar manner above described, and arranged to operate in the relation to each other, and to the currents of wind thrown off by the fan, as fully shown in Fig. 1, substantially as and for the purpose set forth and specified.

26,274.—Wm. Linton, of Baltimore, Md., for an Improvement in Filters:

I claim arranging a clamping plate, B, of less diameter than the filtering cylinder, on adjusting screws, g, of the removable head, c, of the cylinder, A, substantially as and for the purpose set forth.

[This cylindrical filter receives the water at one of its ends, changes the direction of the course of the same, and causes it to pass in opposite directions, then to take a course back through three layers of felt, which deprive it of all impurities before it escapes at the opposite end of the cylinder. Having the water to thus circulate, subjects it to the large filtering surface, and insures a perfect filtration. We regard this as an excellent filter.]

26,275.—Peter Louis, of New York City, for an Improvement in Valve Gear of Steam-engines:

I claim, first, The auxiliary cylinder, D, having a partition, g, and arrangement of steam and exhaust passages, substantially as described, and fitted with a valve, T, or its equivalent, and with the two pistons, F F', on opposite sides of its partition, applied substantially as described, in combination with the induction and eduction valves and the shaft of the main engine, so that each of said pistons acted upon by steam admitted to its compartment of the auxiliary cylinder by the valve, T, or its equivalent, serves to open one induction, and the opposite eduction valve of the main engine at the proper time, substantially as described.

Second, In combination with the auxiliary cylinder, D, and its pistons applied and operating as described, to open the induction and eduction valves of the main engine, I claim the employment of the rock shaft, N, and its toes, O O', so applied in combination with the said eduction valves that while they permit the said valves to be opened by the action of the steam on the pistons of the auxiliary cylinder, they keep the said valves open as long as may be desired, substantially as described.

26,276.—T. J. Mayall, of Roxbury, Mass., for an Improvement in the Manufacture of Waterproof Hose:

I claim my improvement in the manufacture of india-rubber or gutta-percha hose or tubing, which consists in impregnating the fibrous fabric which forms the bases thereof with protective or preservative substances, and subsequently coating with india-rubber or gutta-percha, and forming the same into hose or tubing, substantially as described.

26,277.—Thos. J. Mayall, of Roxbury, Mass., for an Improvement in Steels:

I claim as a new article of manufacture, a "steel" or implement for sharpening table-knives, &c., formed of india-rubber or gutta-percha, with which emery, sand, or other suitably gritty substances are incorporated, substantially as set forth.

26,278.—Thos. J. Mayall, of Roxbury, Mass., for an Improvement in the Manufacture of Packing and Tubing:

I claim my new method of forming packing hose, or tubing, and other similar articles, the same consisting in rolling or wrapping the fabric to be used around the core or mandrel by rolling or passing said core or mandrel and the fabric or wrapper together between two surfaces, one of which exerts a self-adjusting yielding pressure upon the article to be formed, while the other surface has the necessary motion imparted to it, to roll or wind the fabric used around the cord or mandrel, substantially as set forth.

26,279.—A. E. McGaughey and S. N. McGaughey, of Wastedo, Minn., for an Improvement in Steam Plows:

We claim, first, The plows, S, attached to radial arms, m, or oscillating shafts, k, and arranged with the pinions, n, racks, T, ratchet toothed hubs, l, and stop-rods, r s, to operate substantially as and for the purpose set forth.

Second, In connection with the plows, S, arranged and operated as described, the rakes or harrows, V, attached to the bars, i i', for the purpose specified.

[This invention consists in the employment or use of a series of intermittingly rotating and oscillating plows, and oscillating or vibrating harrows, so arranged as to operate in a transverse direction with the movement of the machine, whereby several advantages are obtained over all previous arrangements of plows that have passed under our observation. The invention also consists in suspending the boiler on the machine in such a way that it will be retained by its own gravity in a horizontal position, while the machine is passing along, and conforms to the inequalities or undulations of the surface of the ground.]

26,280.—J. H. McNeely, of Indianapolis, Ind., for an Improved Means for Climbing Telegraph Poles:

I claim the combination and arrangement of the hooks, B and C, with the loops, D E and F, and set-screw, G, when constructed and operated substantially as set forth.

26,281.—Reuben Miller, of Pittsburgh, Pa., for an Improvement in Cut-off Apparatus for Steam-engines:

I claim the employment in combination with the tappets, F F', for opening the valve, to effect induction of steam, of the collars, G G', attached to the same valve rod, and the tappet levers, H H', with independent arms, g g', said collars and tappet levers being applied and operating substantially as described, to effect the cutting off the steam at such point in the stroke of the piston, as may be desired.

[This is a cut-off gear of the tappet-motion kind, and though simple it allows the steam to be cut off at any point in the stroke.]

26,282.—John Miner and Silas Merrick, of New Brighton, Pa., for an Improvement in Railroad Cars:

What we claim is, in the construction of railroad cars, inserting strips of wood between the angle iron which forms the framework of the car in combination with panel plates formed of a single piece of iron struck up, whether plain or ornamented, substantially as described.

We also claim constructing the ribs and framework of the car of two strips of L iron, with a bar of wood interposed when these irons and the wood are united by rivets, substantially in the manner described.

26,283.—J. R. Moffitt, of Piqua, Ohio, for an Improvement in Grain Separators:

In the desired combination with a reversible spout adapted to discharge grain at either end of a separating machine, I claim the screen, N, placed within or above the said spout, and operated by the motion of the shoe, for the purpose of screening grain after the action of the winnowing apparatus.

26,284.—F. I. Palmer, of Knoxville, Tenn., for an Improvement in Car Trucks:

I claim the arrangement and combination of the bars, I K L H H, substantially as and for the purpose set forth.

26,285.—J. J. Parker, of Marietta, Ohio, for an Improvement in Paper Files:

I claim the combination with the hinged book-back, of bars, springs and rods, arranged for conjoint operation substantially in the manner described.

26,286.—Dubois D. Parmelee, of Salem, Mass. (assignor to John A. Greene, of Beverly, Mass.), for an Improvement in the Manufacture of Hollow Molded Rubber Goods:

I claim the method herein described of shaping the said articles in molds preparatory to their being vulcanized or hermized, i. e., treated in the cold way by any known process, by applying heat to bags made of india-rubber, its equivalent, or their compound, free from sulphur and inflated with air, so as to snugly fit the molds in the manner substantially as set forth.

26,287.—Francis A. Parmelee, of New Haven, Conn., for an Improvement in Twine Spools:

I claim the combination of the double spool, C C C, with the spindle, D, when the whole is constructed substantially as described.

26,288.—G. H. Peabody, of Columbus, Ga., for an Improvement in Cotton-picker's Wallets:

I claim applying a sponge or other equivalent device to a cotton-picker's wallet, for the purpose of enabling the picker to readily moisten his fingers, and thus facilitate his work as described.

[This invention consists in a novel construction of wallet for the cotton-pickers to strap to their bodies for holding the cotton as it is picked from the bolls with the hands. It is made so as to be strapped to the body in a peculiar manner, so as not to be in the way of the arms nor encumber them in the least. It is furnished with a wet sponge-bag for moistening the fingers, in order that the cotton may be taken hold of and drawn from the bolls more readily by the picker; and it is made so that the bottom can be easily opened for emptying the bag when filled, and closed again for another supply.]

26,289.—Simeon F. Peck, of Pennfield, Ga., for an Improvement in Plows:

I claim the manner of attaching the share, E, the foot-bar, D, to wit; having the back part of the share notched and fitted in a rebate, a, in the foot-bar, and receiving the shoulder, p, formed by the rebate, while the ends, f, of the share fit underneath the projections, c c, and the lever, E, is pressed on the outer side of the share by means of the wedge, G, substantially as shown.

[This invention relates to an improvement in that class of plows which have a shovel-shaped share attached to a foot-bar, and are generally known as "shovel plows." The invention consists in a novel way of attaching the share to the foot-bar, whereby an extremely simple and efficient connection is obtained (bolts and rods being avoided), and the share very readily attached to and detached from the foot-bar.]

26,290.—William Peters, of Baltimore, Md., for an Improved Propeller and Paddle-wheel Shaft:

I claim a propeller or paddle-wheel shaft, constructed as set forth.

26,291.—S. M. Perkins, of Albany, Ill., for an Improvement in Whiffletree Hooks:

I claim, first, The combination of the stud with a revolving spring button, arranged substantially as described for the purpose set forth.

Second, in combination with a revolving spring button, I claim a stationary stop, D, so arranged as to prevent the eye of the trace in all positions from passing over the buttons.

Third, I claim the combination of the spiral spring, the projecting stud, and the inner stop, arranged substantially as described for the purpose set forth.

Fourth, I claim constructing the button with the hooded end, substantially as described for the purpose set forth.

26,292.—Charles Perley, of New York City, for an Improved Chain Cable Stopper:

I claim the bridge, k, over the chain, in combination with the cable-stopper, for the purpose of forcing the chain into said stopper, in the manner and substantially as specified.

26,293.—Gideon Pierce, of Ercildown, Pa., for an Improvement in Horse Rakes:

I claim the arrangement of the cog wheel, b, rack, c, lever, I, frame, d, bar, G, standard, g, and teeth, f, operating substantially as and for the purpose set forth.

26,294.—Matthias Reaser, of Reading, Pa., for an Improvement in Horse Hay Rakes:

I claim the combination of the rock shafts, N and O, clearers, P, teeth, c, brace guides, L, spring-bar, F, pins, e and f, springs, d and g, with the draft-bar, I, when the several parts are arranged and operated in the manner and for the purpose described.

26,295.—Charles W. Richter, of Madison, Ga., for an Improvement in Lamps:

I claim the use of the wick-adjuster, formed of the bar, f, provided with a toothed plate, r, at its inned end, and so arranged as to have a certain degree of longitudinal adjustment in relation with the wick, u, for the purpose set forth.

[This invention relates to an improvement in that class of lamps which are designed for burning those hydro-carbons that volatilize and gassify at a low temperature, such, for instance, as a combination of turpentine and alcohol, generally known as "burning-fluid," the light or spirituous coal-oils, &c., &c. The invention is an improvement on a lamp recently patented by this inventor, the Letters Patent bearing date Feb. 22, 1859; and its object is to more fully carry out the principle involved in the patented lamp alluded to, to wit, the keeping of the fount, and consequently its contents, at a low temperature, thereby preventing explosions, and also to prevent the charring or burning of the wick, and the regulating of the volume of flame to increase or diminish the light, as may be desired.]

26,296.—Wm. Salisbury, of Wheeling, Va., for an Improved Catch-bolt:

I claim the use of the lever, C, combined and arranged with the catch-bolt, B, to operate substantially as and for the purpose set forth.

[This invention relates to an improvement in that class of catch-bolts which are self-catching; that is to say, those which are provided with a basil at their outer ends, and are forced inward by being shoved or drawed in contact with a a proper nosing as the door is closed, a spring forcing the end of the bolt within the nosing. The object of the invention is to avoid the friction, and consequent wear, attending the operation of the ordinary catch-bolt, thereby rendering the device not only much more durable, but also causing the same to catch or operate with less noise and concussion than usual as the door is closed.]

26,297.—Henry Sanders, of Utica, N. Y., for an Improvement in Cultivator Teeth:

I claim the flanches, a a, and semi-circular projection, B, on the tooth, and the flanches, c c, and pin, e, on the chair, when constructed and arranged in relation to each other in the manner substantially as described and for the purposes set forth.

26,298.—Samuel Smith, of Philadelphia, Pa., for an Improvement in Cooking Stoves:

I claim, firstly, The grate, G, having hollow bars communicating with each other, and arranged in respect to the hollow back, L, and its zigzag passages, as set forth for the purposes specified.

Secondly, The plates, r and s, of the grate, G, when arranged as specified, so as to serve the double purpose of connecting the bars of the grate together and forming a chamber for heating the air preparatory to the same being discharged in jets into the front of the fire.

26,299.—James Speers, of West Manchester, Pa., for an Improved Water-heater for Steam-engines:

I claim, first, The arrangement of the float, h, lever, f, valve, o, partition, k, and pipes, b c and x, when arranged substantially as described, for the purpose of constructing water-heaters for supplying the force pumps of steam-engines with heated water.

Second, The use of the branch pipe, x, when used in connection with pipe, c, and valve, o, as described and for the purpose set forth.

26,300.—Henry Steinway, Jr., of New York City, for an Improvement in Pianofortes:

I claim the employment, in combination with the agraffs, C C, of the projection, a, on the underside of the plate, lapping over and abutting against the edge of the tuning-block, substantially as described, for the purpose specified.

26,301.—David Stoddard, of San Francisco, Cal., for an Improvement in Valve-gear for Steam-engines:

I claim the use of the fixed cam, A, in combination with the adjustable cam, B, and the rocking bar, E, which is connected to the cam rod, and also connected to and operated by the cam yokes, substantially in the manner described.

26,302.—J. E. Sturdy, of Augusta, Maine, for an Improvement in Shingle Machines:

I claim the use, in connection with the shingle-sawing machine described, of the guides, I I, attached to the bolt carriage, E, and actuated alternately to perform their proper function to the planer, L; the whole being arranged substantially as and for the purpose set forth.

26,303.—Joseph R. Swift, of New Orleans, La., for an Improvement in Railroad Car-couplings:

I claim the combination of the peculiarly-constructed draw head, A B f g p c, with the peculiarly-constructed, elbow-shaped gravitating lever-hook, c m n, in the manner and for the purpose described.

[This self-coupler appears to be just the thing for railroad companies, it being almost as simple as the common coupling-pin, and yet free from the very great objection to the same, viz.: the necessity of the train "hand" going between the cars to couple them together; it also possessing the very important advantage of providing a sufficient leverage in the coupling-hook itself, whereby the cars can be uncoupled while in motion or exert longitudinal strain on the link. As a whole, this is certainly one of the simplest and most perfect self-acting couplings that has ever come to our notice, and we cannot see why it should not be generally adopted, and thus save the limbs and lives which are frequently lost in coupling cars together with the ordinary coupling-pin.]

26,304.—J. B. Thompson, of Philadelphia, Pa., for an Improvement in Metal Strings for Pianos, &c.:

I claim the employment, for the strings of pianofortes and other musical instruments, of hardened and tempered steel wire, as described.

26,305.—S. H. Swift, of Morrisville, Vt., for Improvement in Apparatus for Elevating Water:

I claim the buckets, B, curved at the rear, as described, in combination with the trunnions, T, band, p, notched flanged wheel, W, roller, R, and frame, E, constructed and operating substantially in the manner and for the purpose set forth.

26,306.—George W. Tolhurst, of Liverpool, Ohio, for a Composition for Making Soap:

I claim a soap compound when prepared of the ingredients proportioned in the quantities hereafter mentioned, viz.: five ounces common bar soap, four ounces sal soda, half ounce borax, half drachm of sugar, burned, and one teaspoonful of linseed oil; add as much rain water as to make a soap of suitable consistency; after it is boiled, it is ready for use.

26,307.—Alfred F. Toulmir, of Ellicott's Mills, Md., for an Improvement in Railroad Car Brakes:

I claim the mode described of simultaneously applying or putting down brakes by means of the brake cord, E c d, the box spring, W, the crank lever, k, the trigger, P, the cross piece, x, the slide, l, and the swivel bar, b, with its springs, S S and S S, arranged as described.

I also claim the mode described of instantaneously freeing, relieving or raising the brakes, and of keeping them free when raised, until the conductor, engineer or brakesman shall desire to apply them, by means of the forward or tractive movement of the train in combination with the slide, l, the cross piece, x, and the trigger with its shoulder, V, arranged and operated as described.

26,308.—John G. Treadwell, of Albany, N. Y., for an Improvement in Stoves:

I claim the arrangement of the stove, A, flue, B, door, F, flue, D, and smoke-pipe, C, when the flue, B, is secured to or made a part of the underside or bottom of the stove; the several parts being connected and constructed substantially as and for the purpose specified.

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26,309.—Henry George Tyer, of Andover, Mass., for a Composition for Soles and Heels of Shoes and Boots, Veneers, Packing, and other purposes:

I claim a composition made of vulcanized india-rubber, leather and gutta-percha, in the proportions and manner set forth.

[This composition is made by masticating finely granulated waste leather and finely granulated old vulcanized rubber with gutta-percha, while subjected to heat.]

26,310.—I. T. Vankirk, of Frankfort, Pa., and Wm. M. Fulton, of Granberry, N. Y., for an Improvement in Lamps:

We claim the spindle, B, with its cog wheels, D: the said spindle being confined to its place by and acted upon by a spring attached to the wick-tube, and arranged in respect to the latter as and for the purpose set forth.

26,311.—D. S. Wagener, of Penn Yan, N. Y., for an Improvement in Grain Separators:

I claim the case, i, with its flanges or divisions, t, surrounding distributor or sheath, r, or its equivalent, for distributing the grain in a circular form within said case, and separating the impurities from the grain at said point by means of a suction and blast-fans, or by a suction or blast-fan, operating as described and for the purposes set forth.

26,312.—John H. Wells, of Brooklyn, N. Y., for an Improved Rocking-chair:

I claim the arrangement described of the legs, 1 2 3 4, the hinge joint at 7 7, connecting the seat with the underwork, and the springs, 8 and 9, substantially as and for the purpose set forth.

26,313.—Calvin D. Wheeler, of New York City, for an Improvement in Machines for Cleaning Animals:

I claim arranging and combining with a portable case or frame, a rotating comb and brush, substantially as set forth and for the purposes specified.

26,314.—C. W. Williams, of Port Jervis, N. Y., for an Improvement in Canal Locks:

I claim the arrangement of the sliding shaft. R. gearing, S M P, sliding rack, N, rods, O i i i, wickets, F, and gate, E, applied to a canal lock substantially as and for the purpose set forth.

Second, The employment of the guard-strip, I, applied to the gate, E, and arranged substantially as and for the purpose set forth.

[The object of this invention is to facilitate the manipulations of the gates and wickets of the lock, so that an attendant can, from a single spot, operate the whole of them in passing a boat up or down. The invention consists in a peculiar mechanism employed for operating the upper wickets and gate, and also in a guard attachment applied to the upper gate, a straixing-rod attached to the lower gates, and anti-friction devices applied to both the upper and lower gates, whereby the desired end is attained.]

26,315.—Seth Wilmarth, of Charlestown, Mass., for an Improved Machine for Drawing Bolts:

I claim the combination and arrangement of the several parts specified and illustrated, substantially as and for the purposes set forth.

26,316.—Wm. Wilmington, of Toledo, Ohio, for an Improvement in Grain Separators:

I claim, first, The combination of the endless belt, D, the dividing-board, H, and the rotary reciprocating-bars, G; the belt being separated from the bars by means of the board, H, used for delivering the straw and unseperated grain to the bars and its turning point, substantially as and for the purpose specified.

Second, I claim the combination of the teeth on the underside and end of the bars with the fingers or comb for the purpose described.

26,317.—Martin Winger, of Lancaster county, Pa., for an Improved Machine for Shaving Bark:

I claim the combination of the convex traveling bed, O W, with the rotary knives, V, and pressure-rollers, 1 2 4 and h, in the manner and for the purpose set forth.

26,318.—John E. Wooten, of Philadelphia, Pa., for an Improvement in Moving Locomotive-engines by Hand-power:

I claim the application of the hydraulic piston, D, to the purpose of propelling a locomotive-engine or railroad car upon the track by its direct action upon the periphery of the wheel, as described, combined with the peculiar arrangement of the plunger, E, in reference to the piston, D, whereby the latter is caused to advance and recede in concert with the plunger by the aid of atmospheric pressure, and without the intervention of valves, in the manner and for the purpose substantially as set forth.

26,319.—Oscar M. Andrews, of Hecla Works, N. Y. (assignor to A. K. Seymour, of same place), for an Improved Blind-fastener:

I claim the arrangement on the side of the frame, B, of a shutter or blind, A a, rotary wedge-shaped cam, D, in combination with a hook, a', or its equivalent, fastened substantially in the manner and for the purpose specified.

[The object of this invention is to fasten a blind or shutter when the same is open, in such a manner that the fastening can be reached without thrusting the head and body out of the window. This object is obtained by attaching to the side of the frame to which the blind or shutter is hinged, a rotary cam of particular construction, which catches into a hook formed by the hinge, or by a separate piece secured to the shutter.]

26,320.—George Bradley, of Paterson, N. J. (assignor to Jacob S. Rogers, of same place), for an Improvement in Can Bottoms for Roving:

I claim so mounting two or more can bottoms, C C, that the filled can may be removed from under the coiler, and an empty one substituted in its place by means, simply, of a partial rotation of the frame, H, substantially as described.

26,321.—John P. Broadmeadow (assignor to himself and Albert Eames), of Bridgeport, Conn., for an Improvement in Molding for Metal Casting:

I claim the combined use of a half flask of a sufficent size to hold the quantity of loose sand required to form a half mold, and of a follow board, small enough to enter the said half flask and act as a piston to compress the sand therein, when pressure is applied, substantially as set forth.

I also claim the combined use of a half flask, as above described, and of a strike whose profile corresponds in form with the transverse section or profile of the pattern, substantially as set forth.

I also claim the combined use of a half flask, as above described, constituting the cope of a ribbed cope plate fitted to enter therein, and of sustaining pins in the said cope, the whole operating substantially as set forth.

I also claim the combined use of the aforesaid cope plate, of a button plate fitted to enter the drag of the flask, and of clamps, substantially as set forth.

I also claim combining the sprue pattern with the follow board, when this combination is used in connection with a match board having an opening to permit the descent of the lower end of the sprue pattern, substantially as set forth.

I also claim the combination of projections or indentations, or both, with the follow board, in contra-distinction to constructing the flasks with projections and indentations.

26,322.—Almon Cooley (assignor to E. W. Sperry, J. H. Ashmead, E. Hurlbut and Henry E. Robbins), of Hartford, Conn., for an Improvement for Holding Knife-handles for Soldering:

I claim the above-described device for holding knife-blades, handles, &c., for soldering together, or their substantial equivalents, the rods, C, cap, D, bar, E springs, I, operating in the manner substantially as set forth, for the purpose specified.

26,323.—Almon Cooley (assignor to E. W. Sperry, J. H. Ashmead, E. Hurlbut and Henry E. Robbins), of Hartford, Conn., for an Improvement for Holding Knife-handles for Soldering:

I claim the above-described device for securing or holding handles (formed of two parts) for soldering, or their substantial equivalents. The adjustable yielding clamps or brackets, G L, substantially in the manner and for the purpose described. The combination of the yielding clamps or brackets, G L, with a turntable, D, or their substantial equivalents, substantially in the manner as and for the purpose described.

26,324.—Thomas Harvey (assignor to himself and David Kramer), of Wooster, Ohio, for an Improved Washing-machine:

I claim the combination of the two vertical movable plates, L L', with the inclined planes, D D', and the fixed, perforated, corrugated partition, N, the whole constructed, combined, arranged and operated as described and for the purposes set forth.

26,325.—Wheeler Hedges (assignor to himself and P. W. Gates), of Chicago, Ill.), for an Improvement in Pans for Evaporating Sugar Juice:

I claim, first, The arrangement of the pipes, E E, with the pipe, F, in pan, B, so that the application of steam to the pipes, E E, will cause the greatest ebullition and the foam to raise highest longitudinally in the middle of the pan, B for the purpose of causing all impurities to be deposited upon the flaring sides, P P, of the pan, B.

Second, The construction and application of the flaring sides or beaches, P and P, that, by their great obliqueness, retain all the scum thrown upon them, substantially as specified.

Third, The construction and application of a defecator, D, in combination with the evaporator, substantially as specified and for the purpose set forth.

Fourth, The stop boards, Q Q, in combination with the evaporator, as described and for the purpose set forth.

26,326.—Mathew Hodkinson (assignor to Mathew Hodkinson, Jr.), of Pittsburgh, Pa., for an Improvement in Retorts for Distilling Coal Oil:

I claim the stationary retort with a shaft armed with knives, whose edges are at right angles with the shaft passing through it, by which, when motion is given to the shaft, the coal is broken and pulverized more effectually and more economically than by any other method.

26,327.—Francis J. La Forme, of Boston, Mass., for an Improvement in Nursing Bottles:

I claim the improved nurse bottle, or one having an elastic tube, constructed and applied thereto in the manner and for the purpose set forth.

26,328.—Daniel Penman and Elisha Fitzgerald (assignors to Wm. C. Walker and M. Penman), of New York City, for an Improved Machine for Manufacturing Ruches:

I claim the pressing bar, A, attached to the shaft, L, by the arms, M, (said arms having a crank, B,) at its end, for the purpose described, in combination with the adjustable gage bar, I, hook rods, D, and treadles, H; the whole being constructed and operated substantially in the manner and for the purposes set forth.

26,329.—Newman Silverthorn, of Prescott, Wis. (assignor to James M. Allen, of Fredericktown, Ohio), for an Improved Boot and Shoe Tip:

I claim a boot or shoe tip made of any of the known preparations of india-rubber or gutta-percha, and to be applied to the boot or shoe in the manner substantially as herein described.

RE-ISSUES.

O. W. Minard, of Waterbury, Conn., for an Improvement in Making Brass Kettles. Patented April 15, 1856:

I claim the employment of two rotating rollers, for griping, turning and rolling the disk of metal, substantially as described, in combination with the clamps or holders for holding the disk of metal at any desired angle with the axis of the rollers, substantially as described and for the purpose specified.

And I also claim the concave and convex clamping plates, substantially as described, in combination with the rollers or any equivalent mode of rolling the metal, substantially as described.

And I also claim, in combination with the rollers for rolling the disk of metal, the supporting-rest for supporting the metal beyond the point of action of the griping rollers, substantially as set forth.

Jeremiah W. Malley, of Amsterdam, N. Y., for an Improvement in Reaping and Mowing Machines. Patented February 10, 1857:

I claim so constructing and arranging the platform of a reaper as that it or a portion of it may be made to form a track-clearer when it is desired to convert the machine into a mower, substantially as specified.

Jeremiah W. Mulley, of Amsterdam, N. Y., for an Improvement in Reaping and Mowing Machines. Patented February 10, 1857:

I claim the hollow reel-shaft made of sheet metal or its equivalent formed with boxes or bearings at or near each end, and made to revolve on an arm supported at one end only, substantially as specified.

Jeremiah W. Mulley, of Amsterdam, N. Y., for an Improvement in Reaping and Mowing Machines. Patented February 10, 1857:

I claim, first, The manner herein described of securing the detachable cutters or blades to or in their place on the cutter-bar, and relatively to each other, by means of central holding-screws, in combination with pins or studs on the bar, to fit the recesses in the adjoining sides of the blades, substantially as set forth.

Second, Providing the fingers with the laterally-projecting lips in front and rear of the slot in which the cutter-bar plays, substantially in the manner and for the purposes specified.

Third, The finger-bar arched as described, in combination with the fingers made with a swell or convex projection in their rear, substantially as set forth.

ADDITIONAL IMPROVEMENT.

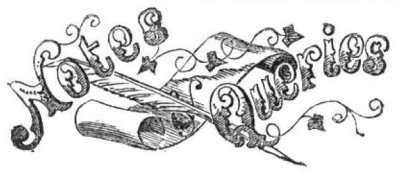
W. W. Hollman, of Eddyville, Ky., for an Improvement in Straw-cutters. Patented March 30, 1858:

I claim the combination and arrangement of the devices for operating the knife and feeding-box, substantially as above described.

DESIGN.

J. B. Virolet (assignor to John W. Hoyt), of New York City, for a Design for Floor Cloths.

NOTE.—The above list of patents contains TWENTY-SEVEN which were prosecuted through the Scientific American Patent Agency.



J. H. W., of Ark.—For a power, when not over 5-horse is required, the motor you mention is a very good and economical one; but when a much larger power is necessary, we could not recommend it.

M. B., of N. Y.—The india-rubber which is made into stamped articles, such as ink-bottles, balls, &c., is softened by passing it between heated rollers. On page 172 of the present volume of the SCIENTIFIC AMERICAN, you will find a full description of the whole process.

C. C. C., of Fla.—A belt from a pulley 9 inches in diameter running 100 revolutions per minute will drive a 7 feet pulley 103¼ revolutions per minute. The danger of the belt slipping on the small pulley would depend on its width and on its length or distance apart of the pulley; the wider and longer the better. Guild, Garrison & Co., 74 Beekman-street, this city, make pumps for pumping hot sirup, but not small ones for hand-pumps, and we cannot tell you where such are made.

T. E., of Ga.—It is said that the Ericsson engine requires less fuel than a steam-engine, but the point on which we should require to be satisfied, if we were thinking of purchasing, is whether an Ericsson nominally of 8-horse power will really do as much as an 8-horse power steam-engine.

J. L., of N. Y.—We are told by importers of looking-glasses that no magnifying mirrors of large size are now brought into this country. The price of one six inches in diameter is $3.

N. F. N., of Mass.—Small emery wheels are made of india-rubber and emery, the two substances being mixed together and molded into form, by the "New York Belting and Packing Company," No. 37 Park-row, this city.

P. O., of Conn.—We have examined the sketch and description of your alleged improvement in sewing-machines, and we are of the opinion that a patent can be procured for it. It will not, in our opinion, interfere with the claims of Singer's patent to which you refer. We have sent you a copy of our pamphlet of advice. We are much obliged for your kindness in securing us a list of subscribers.

J. J., of Pa.—We have carefully examined the statements you make in regard to your invention, and we are clearly of the opinion that you are entitled to an extension of your patent. Your case must be well prepared in all its points, and the sooner you place the matter in our hands the better.

W. R. A., of Ga.—A patent was granted several years ago for an apparatus, whereby the presence of fire in any room could be communicated to an alarm by the expansion of wire. We once had such a thing in use, and are gratified to say that it never came into practical operation.

A. J. B., of Ky.—The ambrotype which you send us of something so nearly resembling a human head and face, and which you say grew in a cavity in the middle of a large live maple tree, would be very interesting if the facts of its discovery were fully authenticated. So many attempts have been made to impose on men of science, that we are becoming very suspicious. The question is, how much whittling was done for this face?

S. H. G., of N. J.—You can bleach ivory by submitting it to the action of sunlight, and moistening it frequently with water. The process is the same as the old fashioned method of bleaching linen. You could not practice this system with the keys of your piano, except by placing the instrument close to the window exposed to the sunshine, then moistening the keys slightly and frequently with a sponge. The moisture must be applied very carefully, so as not to effect the glue with which the key-tops are cemented.

H. & W., of R. I.—We are glad to know that your advertisements in our paper are doing you so much good, and that your business is, in consequence, so rapidly increasing. We believe no other journal in the United States offers the same advantages to advertisers, in its peculiar sphere, as the SCIENTIFIC AMERICAN. We could, by effort, largely increase our advertising patronage, and it would be very profitable to us; but we have hitherto declined taking the space from our readers.

A. S., of N. Y.—You say, "Suppose A buys a machine of B, with the right of manufacturing articles with the said machine, which is patented, and C comes along with a machine which is an improvement on B's machine, and A buys C's improved machine; can A use C's machine for manufacturing purposes without the consent of B?" We answer, Yes; A can use C's improvement without B's consent. But if A had not previously obtained the right to use B's invention, he could not use C's improvement if the latter infringed B's.

Money Received

At the Scientific American Office on account of Patent Office business, for the week ending Saturday, Dec. 3, 1859:—

J. S., of N. Y., $35; J. E., of Cal., $35; H. K., of Ill., $30; A. B, J., of Ind., $30; P. & B., of Tenn., $25; H. L. C., of Pa., $30; T. H. L., of N. Y., $55; Mfg. K. M. Co., of N. Y., $275; C. B. R., of Conn., $30; L. & B., of N. Y., $60; C. & Z. W., of N. J., $25; W. C., of Mass., $35; A. M., of Ind., $20; L. B., of Wis., $55; P. Van V., of N. Y., $30; F. O., of N. Y., $25; S. B., of N. J., $27; G. W. D., Jr., of Va., $30; G. E. H., of N. Y., $30; H. W., of Ky., $45; B. D. E., of Ohio, $25; J. C., of N. Y., $60; G. W. D., of Ill., $60; E. D., of Wis., $10; E. R., of Conn., $50; J. R. E., of La., $25; C. H., of La., $50; A. A. W., of N. Y., $35; N. P., of N. Y., $25; J. B. J., of N. Y., $30; J. G., of Conn., $35; A. T. U., of N. Y., $27; B. A. J., of Wis., $65; J. K. L., of Ohio, $25; S. F. Van C., of Cal., $20; A. M. D., of Ill., $25; F. D. B., of Mass., $25; J. W. M., of Mass., $30; T. J. S., of Maine, $20; T. B., of N. Y., $15; A. R. T., of La., $325; J. K., of N. J., $30; J. M. H., of Miss., $25; J. D. M., of Ohio, $30; L. P. M., of N. Y., $30; J. M. F., of Ill., $35; R. H., of N. Y., $30; H. W. H., of Conn., $250; R. N. T., of Conn., $25; J. R. G., of N. Y. $55.

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Specifications, drawings and models belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Dec. 3, 1859:—

I. K. L., of Ohio; B. S. C., of N. Y.; G. W. D., of Ill.; J. Q., of N. Y.; P. & B., of Tenn.; A. A. W., of N. Y.; C. & Z. W., of N. J.; N. A., of Conn.; C. B. R., of Conn.; B. F. R., of Ala.; J. C., of N. Y.; J. S., of N. Y.; A. T. U., of N. Y.; M. & B., of R. I.; J. R. E., of La.; E. D., of Wis.; J. W. C., of N. Y.; I. G., of Conn.; S. B., of N. J.; A. P. M., Jr., of Miss.; D. N., of Ill.; H. W., of Ky. (two cases); F. O., of N. Y.; I. B. H., of N. Y.; L. F., of N. Y.; H. L., of Pa.; F. D. B., of Mass.; A. M. D., of Ill.; G. W. R., of N. Y.; J. E., of Cal.; N. P., of N. Y.; I. M. H., of Miss.; R. N. T., of Ct,

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Auf der Office wird deutsch gesprochen.

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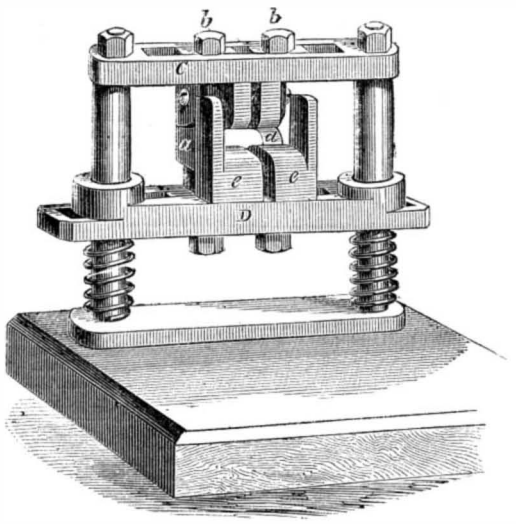
STEMPEL'S TRACE-TRIMMER.

This is a simple little device for trimming the corners of traces in a rounding form, by drawing them between two curved knives, which are set in a frame in such manner that they may be adjusted to traces of different widths. In the cut, *a a* are the curved knives, firmly

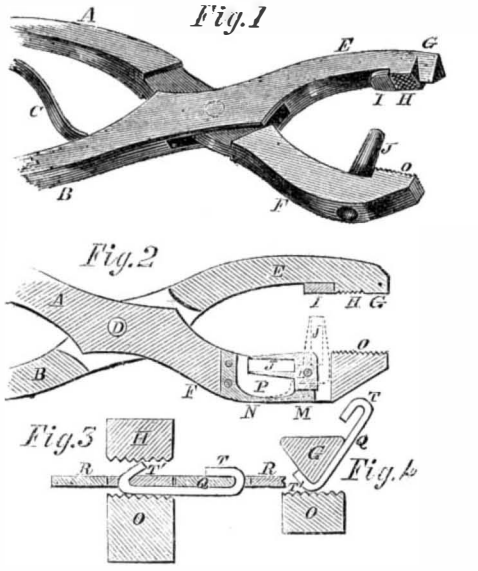


fastened by screws to the blocks, *b b*, which blocks may be secured at any desirable distance apart (depending on the width of the trace) in the slot in the cross-bar, C. The blocks, *e e*, which are fashioned to guide the belt and hold it in a proper position in relation to the knives, are also adjustable in the slot in the cross-bar, D, to which they are secured, and which is held in position by spiral springs, so that it may yield, and thus adapt itself to leather of various thicknesses. When the knives and guiding-blocks are properly set, the belt is drawn through between them, and is thus quickly trimmed on both sides with the utmost nicety.

This invention was made by Adolphus Stempel, of Newark, N. J., who has assigned it to himself and Owen McFarland. The patent was issued Oct. 4, 1859, and inquiries for further information in relation to the matter may be addressed to A. Stempel or O. McFarland, at Newark, N. J.

COMBINED PUNCH AND PINCHERS.

The accompanying engraving illustrates a convenient implement for fastening belts together, intended especially to be used in combination with a peculiar belt-hook which is plainly represented in Fig. 3.

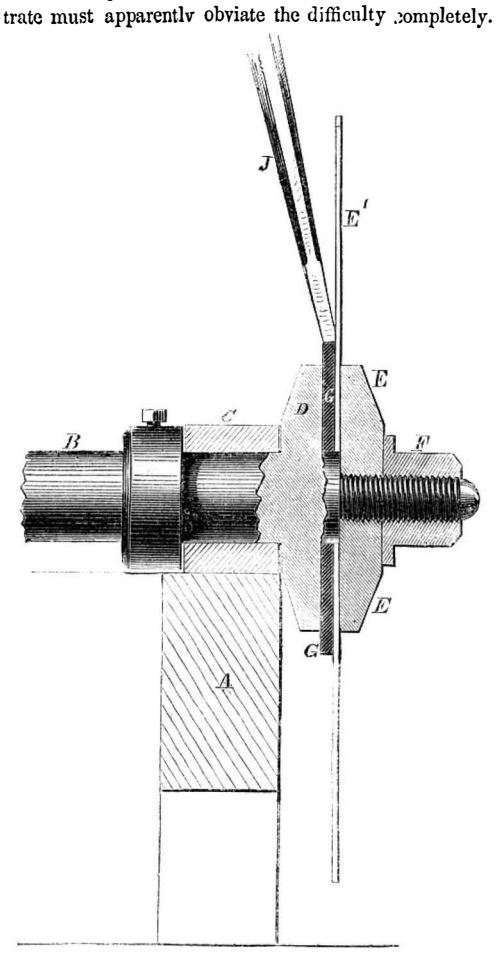


A pair of ordinary pinchers, Figs. 1 and 2, are constructed with peculiar shaped jaws and a pivoted punch which may be turned down out of the way into a recess provided for it in one of the jaws. The punch, J, Fig. 2, is pivoted at L, so that it may be turned into the recess as represented, or may be turned up into the position shown by the dotted lines. The spring, P, holds it in either position. I, is a piece of copper or other soft metal to meet the edge of the punch; H, and O are roughened surfaces by which the belt may be held when it is grasped by the pinchers. Fig. 3 represents the mode of fastening the ends of the belt together. Q, is one of the metallic belt-hooks, of which several are used, the number varying with the size of the belt; R, and R, are the two ends of the belt, O and H, are the two jaws of the pinchers in the act of bending down one end of the belt-hooks, the opposite end having been previously bent as shown. When it is desired to shorten the belt, one end is cut off along the holes of the hooks, the waste piece is seized by the pinchers and twisted out from the hold of the hooks, and the free ends of the hooks are partly straightened by means of the triangular end, G, of the jaws, as shown in Fig. 4.

The patent for this invention was granted Sept. 27, 1859, to Noah E. Hale, of Nashua, N. H., to whom inquiries for further information in relation to it may be addressed.

COLVILLE'S IMPROVED METHOD OF ADJUSTING CIRCULAR SAWS.

The great velocity with which circular saws are caused to revolve renders it very important that they should run uniformly in one plane without any vibration, and the perfect accomplishment of this object has been practically one of the most difficult things in using this most valuable implement. The device which we here illustrate must apparently obviate the difficulty completely.



It consists in interposing a ring of copper between the two collars which hold the saw in place on the shaft, and upsetting or thickening this ring as may be required to bring the saw at precisely right angles with the shaft. E is the saw, B the shaft, C one of the journals, and A the support of the journal, C. The collar, D, is fixed firmly on the shaft, while the collar, E, is loose and is held by the nut, F. G is the copper ring placed around the shaft between the saw and the fixed collar, D, beyond the edge of which it projects about an eighth of an inch. The punch or chisel, J, with a square end, is used for driving upon the edge of the copper ring, on which ever side is found necessary to bring the saw to precisely right angles with the shaft. By this plan the saw may be fixed with the most exact nicety without removing the nuts and collars, and with the least possible labor.

The patent for this invention, which was obtained through the Scientific American Patent Agency, was issued Nov. 1, 1859, to John Colville, of Wilmington, N. C., who has assigned the right to himself and T. L. Colville, and inquiries for further information may be addressed to either of those gentlemen as above.

Hon. Judge Mason, Ex-Commissioner of Patents, is now in Washington, busily employed in the preparation of a case to be argued by him before the United States Supreme Court, involving a claim against the government of $6,000,000.

MECHANICS

INVENTORS, MACHINISTS, MILLWRIGHTS, AND MANUFACTURERS.

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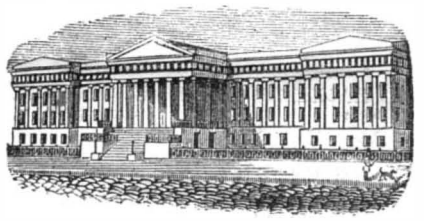
IMPORTANT TO INVENTORS.



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Consultation may be had with the firm, between NINE and FOUR o'clock, daily, at their PRINCIPAL OFFICE, No. 37 PARK ROW, NEW YORK. We have also established a BRANCH OFFICE in the CITY OF WASHINGTON, on the CORNER OF F AND SEVENTH-STREETS, opposite the United States Patent Office. This office is under the general superintendence of one of the firm, and is in daily communication with the Principal Office in New York, and personal attention will be given at the Patent Office to all such cases as may require it. Inventors and others who may visit Washington, having business at the Patent Office, are cordially invited to call at our office.

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The annexed letters from the last two Commissioners of Patents we commend to the perusal of all persons interested in obtaining Patents:—

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CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

Communications and remittances should be addressed to

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